

continued from page 1

helping Australians to meet these requirements for plant and marine sources of omega-3.

### *Omega-6:omega-3 ratio*

Perhaps one of the more interesting findings from the current position is the re-evaluation of the importance of the omega-6:omega-3 ratio. A recent review examined whether this ratio was more important in reducing cardiovascular disease risk than total polyunsaturated fat intake<sup>(6)</sup>. Findings suggest that the omega-6:omega-3 ratio has limited value and consuming omega-6 does not negate the cardiovascular benefits of consuming omega-3s. This confirmed findings from the Health Professional Follow Up Study, which showed that omega-6 intakes did not inhibit the anti-inflammatory effects of omega-3<sup>(7)</sup>.

### MONOUNSATURATED FAT

There has been little new evidence in the last decade to show an increased role for monounsaturated fat in reducing cardiovascular risk. Recent epidemiological evidence suggests an association between monounsaturated fat intake from olive oil and lower blood pressure, but limited evidence to show beneficial effects on anticoagulation factors and inflammation. Replacing saturated fat with monounsaturated fat does lower total and LDL-cholesterol, but not to the same extent as polyunsaturated fat.

### PHYTOSTEROL-ENRICHED FOODS

This is the newest area of investigation since 1999 and the evidence shows value for foods enriched with plant sterols for cardiovascular risk reduction. There is convincing evidence to show that the daily intake of 2-3g

of phytosterols/stanols lowers LDL-cholesterol levels by approximately 10% in healthy individuals, those with high cholesterol and with diabetes<sup>(8,9)</sup>. This intake can be achieved by the consumption of 2-3 serves of phytosterol-enriched foods like margarine spreads and milk. For people at greater risk of cardiovascular disease, these foods can be an additional option for risk reduction as when combined

## *The omega-6: omega-3 ratio has limited value and consuming omega-6 does not negate the cardiovascular benefits of consuming omega-3*

with statins there is an additive cholesterol lowering effect<sup>(10)</sup>. Any resulting decrease in blood carotenoid levels from phytosterol consumption can be overcome with additional servings of carotene-rich fruit and vegetables.

### TOTAL FAT AND SPECIFIC FOODS

Once again, there is no direct relationship between total fat intake and cardiovascular disease and inconclusive evidence to support a relationship between dietary cholesterol and cardiovascular outcomes. Dietary cholesterol does increase cholesterol levels, but substantially less than saturated or trans fat.

Where specific foods were examined, it was shown that Australians can consume up to six eggs a week within a cardio-protective eating plan without increasing their risk of cardiovascular disease<sup>(11)</sup>. Any more than six eggs may increase risk in people with type 2 diabetes. Epidemiological studies also show

a consistent cardio-protective effect for nut consumption<sup>(12)</sup>. This was true for a range of nuts across varied populations.

For all the evidence and position papers, plus a list of the Heart Foundation's new Healthy Eating and Drinking Tips for consumers visit: [http://www.heartfoundation.org.au/Healthy\\_Living/Eating\\_and\\_Drinking](http://www.heartfoundation.org.au/Healthy_Living/Eating_and_Drinking)

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### CONTENTS

1 DIETARY FATS AND DIETARY STEROLS: NEW HEART FOUNDATION POSITION STATEMENT  
Barbara Eden

2 EDITORIAL PROMOTING CARDIOVASCULAR HEALTH: FROM SCIENCE TO COMMUNICATION  
Michelle Gordon

3 GETTING TO THE BOTTOM OF THE CUP: HOW TEA FLAVONOIDS IMPROVE VASCULAR HEALTH  
Jonathan Hodgson

4 BEYOND LOW FAT TO BETTER FAT DIETS  
Murray Skeaff

5 NEW FRONTIERS: A TASTE OF THE FUTURE FOR DIET AND CHOLESTEROL  
Peter Jones

6 NUTRITION BELIEFS AND PRACTICES OF GPS TREATING ELEVATED CHOLESTEROL  
Michelle Gordon

7 A GP'S PERSPECTIVE  
Tony Helman

## Dietary fats and dietary sterols: New Heart Foundation Position statement by Barbara Eden



*It's been a decade since the National Heart Foundation of Australia released its 1999 position statement on dietary fats and dietary cholesterol for cardiovascular health. The revised 2009 position statement now includes recommendations for the consumption of omega-3 fat and plant sterol-enriched foods for both the general population and those with an increased risk of cardiovascular disease. This article highlights the key findings, both new and those remaining unchanged since the 1999 position statement.*

### SATURATED FAT AND TRANS FAT

There is little doubt surrounding the negative dose-response relationship between saturated fat intake and cardiovascular disease. By replacing saturated fat with polyunsaturated or monounsaturated fat in the diet, there is a positive influence on cardiovascular risk compared to replacing with carbohydrate<sup>(1)</sup>. In fact, lowering saturated fat intake to less than 7% of energy intake appears to result in better outcomes than previous recommendations to lower intake to less than 10% of energy<sup>(2)</sup>. There is also good evidence to show that trans fat increases cardiovascular risk factors especially at higher intakes and there appears to be little difference in effect between ruminant and industrially produced trans fats. Together, levels of saturated and trans fat in the diet at less than 8% of energy intake can provide optimal cardiovascular risk reduction.

## *Lowering saturated fat intake to less than 7% of energy intake appears to result in better outcomes than previous recommendations*

### POLYUNSATURATED FAT

#### *Omega-6*

New evidence supports the role of omega-6 polyunsaturated fat in reducing cardiovascular risk. In fact, even at higher intakes, there appears to be no adverse effects<sup>(3)</sup>. Linoleic acid, in particular, has been shown to be effective in lowering blood cholesterol levels – more so than monounsaturated fat and carbohydrate<sup>(4)</sup>. Recent dietary modeling by the Heart Foundation has shown that margarine spreads and vegetable/seed oils together with nuts and seeds are important for helping individuals to reach the recommended 8-10% of energy intake from omega-6.

#### *Omega-3*

The evidence continues to mount supporting a positive association between long chain omega-3 intakes and reduced cardiovascular risk<sup>(5)</sup>. Marine fats (EPA + DHA), especially from fish, have been shown to 500mg EPA+DHA per day for primary prevention and up to 1000mg EPA+DHA for those with documented heart disease from a combination of fish and seafood, fish oil supplements or enriched food products.

Plant sources of omega-3, namely shorter chain alpha-linolenic acid, when consumed at levels of 2g per day also reduce cardiovascular risk. This level may be difficult to reach without including plant oils like canola and soybean, margarine spreads, nuts and seeds in the diet. Supplements like flaxseed oil and fish oil capsules will most likely play an increasing role in

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## EDITORIAL

### Promoting cardiovascular health: From science to communication by Michelle Gordon



#### WELCOME TO A NEW ERA FOR PERSPECTIVES!

*It is a privilege to take over the role of Editor for Perspectives, a newsletter that I have held in high esteem and read avidly for years. After 14 years of sharing news and views, Bill's wisdom will be missed, but the journey that lies ahead is an exciting one. This issue brings another development and has Perspectives stepping into the digital age – we launch our new e-newsletter format and all the enhanced functionality it brings.*

*To subscribe just email your name to perspectives.nutrition@unilever.com*

Turning credible science into compelling communication has been the focus of my career to date. With my dietetic training and PhD studies behind me, I was fortunate to spend five years abroad, working with people across the globe. How to help reduce the health burden of the world's number one killer was the challenge that united all the professionals I worked with. Maybe the most motivating part of working in this area was realising that since around 80% of cardiovascular disease is preventable, our work really does make a positive difference to people's health.

With the publication of the new National Heart Foundation of Australia position on dietary fats and dietary sterols, this issue is dedicated to managing cardiovascular disease risk. Barbara Eden gives us a summary of the position statement highlighting where science has developed since the last position was published. The positive influence of omega-6 polyunsaturated fats and plant sterols on cardiovascular health, plus the limited role of total fat intake and the omega-6:omega-3 ratio are some of the interesting take outs. A summary of the Heart Foundation recommendations for reducing the risk of cardiovascular disease can be found below.

Giving highlights from a symposium in New Zealand, Murray Skeaff reminds us that "oils ain't oils" – type of fat is more important than total fat when it comes to managing cardiovascular risk factors. The data recently published by Jakobsen are impressive, replacing 5% of energy as saturated fat with polyunsaturated fat was associated with a 26% reduction in risk of death from heart disease. So, when it comes to replacing saturated fat intake with polyunsaturated fat, small changes really can make a big difference.

#### SUMMARY OF HEART FOUNDATION RECOMMENDATIONS FOR REDUCING CVD RISK

Dietary Intake	Heart Foundation Recommendation
Saturated and trans fat	Less than 7% energy intake from saturated fat Less than 1% energy intake from trans fat Less than 8% energy intake from saturated+ trans fat
Polyunsaturated fat	8-10% energy intake from omega 6 polyunsaturated fat 2g per day of alpha-linolenic acid 500mg per day of EPA + DHA (1000mg for those with documented heart disease)
Polyunsaturated: saturated fat	P:S Ratio > 1
Phytosterol/stanols (in high risk individuals)	2-3g of phytosterols/stanols (2-3 serves of sterol/stanol enriched foods)

Health care professionals have the crucial role of individualising cardiovascular science into patient communication. Findings of a new survey looking at the nutrition beliefs and practises of GPs are reported in this issue. Tony Helman, a GP himself, shares his thoughts on why these GPs, who have a strong interest in nutrition, are not uniformly referring their patients to a dietitian. It seems there is still much work to be done in helping GPs to provide the best dietary advice and treatment to their patients with elevated cholesterol.

The emerging science of today may well inform practices of tomorrow. Jonathan Hodgson shares the potential mechanisms for which tea-derived flavonoid antioxidants exert their positive effect on vascular health. And finally, Peter Jones comments on the science of saponins and glucomannan, emerging dietary factors which may be part of the future for cholesterol-lowering diets.

In the area of nutrition and cardiovascular health, solid science is available to inform practice. In my eyes, the challenge for us is less about what dietary changes should be made, but rather how we can help to make the changes sustainable ones.

#### Happy reading!

Michelle Gordon, PhD APD

*Michelle Gordon is a consultant dietitian. She has a passion for turning credible science into compelling communication for health influencers.*

### Getting to the bottom of the cup: How tea flavonoids improve vascular health by Jonathan Hodgson



*Tea is a popular beverage. In many populations a substantial proportion of total fluid intake is derived from tea. There are two main types of tea: black and green. Both types of tea come from the same plant, however black tea is produced by promoting the enzymatic oxidation of flavonoids present in the tea leaf, and green tea is produced by inactivating these enzymes.*

Much of the interest in the health effects of tea has been because of its high levels of flavonoids, a type of antioxidant present in both black and green tea.

A cup of tea will contain on average about 150 to 300 mg of flavonoids. Daily flavonoid intake varies widely, but can be estimated at around 1000 mg. Thus, as little as 2 to 3 cups of tea per day provides close to half our flavonoid intake. In tea drinkers, tea is usually the main source of dietary flavonoids. Other important sources of flavonoids in the Australian diet include fruits and vegetables.

#### TEA, FLAVONOIDS AND CARDIOVASCULAR HEALTH

There have been more than 20 observational epidemiological studies performed to investigate the relationship of tea or dietary flavonoids with cardiovascular disease risk. Drinking 2-4 cups of black or green tea per day is associated with a 10 to 20% lower risk of cardiovascular disease<sup>(1)</sup>. Similarly, higher flavonoid intake (compared to lower flavonoid intake) is associated with a 10 to 20% lower risk of cardiovascular disease<sup>(2)</sup>. Additional evidence for cardiovascular health benefit derives from studies using animal models of atherosclerosis. These studies consistently show that tea and flavonoids found in tea can inhibit the development of atherosclerosis.

**Many studies have investigated how tea might protect against cardiovascular disease. A beneficial effect of tea flavonoids on vascular function has emerged as a likely mechanism**

#### TEA AND VASCULAR FUNCTION

Many studies have investigated how tea might protect against cardiovascular disease. A beneficial effect of tea flavonoids on vascular function has emerged as a likely mechanism. Dysfunction of the vascular endothelium (the inner lining of all blood vessels) resulting in impaired vasodilation is linked to increased risk of cardiovascular disease. Nitric oxide is an important factor responsible for vasodilation. Thus dietary factors that can augment nitric oxide and enhance vasodilation could reduce the risk of cardiovascular disease.

A number of studies have now investigated the effect of tea or tea flavonoids on nitric oxide metabolism and endothelial function. *In vitro* studies have shown that tea and tea flavonoids can cause nitric oxide-dependent vasodilation. In human intervention trials, both black and green tea has been shown to improve endothelial function acutely and with regular short-term chronic intake. Isolated flavonoids present in tea have also been shown to augment nitric oxide status

and improve endothelial function. Furthermore, these results are supported by studies showing that flavonoid rich preparations derived from other foods and beverages like cocoa can also cause acute and chronic improvements in nitric oxide status and endothelial function.

#### CONCLUSIONS

Population studies suggest that tea and tea-derived flavonoids provide modest protection against cardiovascular disease. The capability of tea flavonoids to augment nitric oxide status, cause vasodilation and improve endothelial function may be an important mechanism helping to explain the benefit of tea on cardiovascular health.

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*Jonathan Hodgson is a Senior Research Fellow in the School of Medicine and Pharmacology, University of Western Australia.*

A symposium titled 'Diet and cholesterol: Unmet potential' was held in Auckland (November, 2008). In the summary below, two of the keynote speakers Professor Skeaff and Professor Jones share highlights of their presentations.

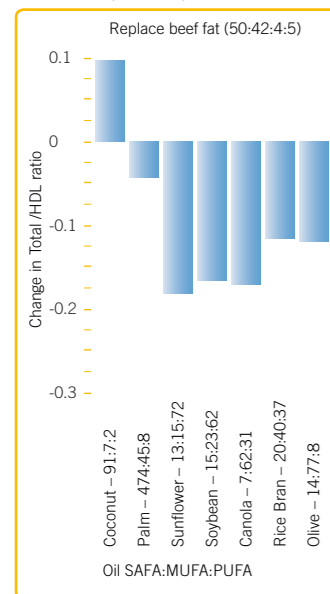


## Beyond low fat to better fat diets

by Murray Skeaff

A common nutrition myth is that all fat is bad and that low-fat diets are healthy. The weight of scientific evidence generated from fifty years of dietary intervention trials shows that, insofar as the fat story goes, it is not the amount, but rather the type of fat that we consume that affects health most.

### EFFECT OF SUBSTITUTING BEEF FAT (10% TE)



### TOTAL FAT HAS LIMITED IMPORTANCE

Some of the most convincing evidence that lowering total fat intake has limited effect on cardiovascular health comes from the Women's Health Initiative, a dietary intervention trial involving almost 50,000 post menopausal women<sup>(1)</sup>. The main goal of the intervention was to reduce total fat intake to 20% of energy. Participants in the intervention group managed to reduce fat intake to 24% of energy – about 10% of energy lower than the comparison group – however, the ratios of saturated, polyunsaturated, monounsaturated and trans fatty acids in their diets were unchanged.

### Low fat diet consumption had no influence on coronary risk factors or the incidence of coronary events

In essence, these women were consuming less of the same kind of dietary fat. Results during the eight year follow-up were disappointing but not surprising, low fat diet consumption had no influence on coronary risk factors or the incidence of coronary events.

### TYPE OF FAT MATTERS

Changing the type of fat consumed has major effects on blood cholesterol and coronary heart disease risk. The results of meta-analyses<sup>(2-6)</sup>, each based on a volume of trial evidence larger than the previous one, have been remarkably consistent:

- saturated fat increases total and LDL-cholesterol
- polyunsaturated fat decreases total and LDL-cholesterol
- trans fat increases total and LDL-cholesterol, reduces HDL-cholesterol, and increase the total/HDL-cholesterol ratio
- replacement of saturated fat with polyunsaturated fat results in a better total/HDL-cholesterol ratio than replacement with either monounsaturated fat or carbohydrate

The Figure shows the predicted effect of replacing 10% of energy as saturated fat from beef fat with coconut, palm, sunflower, soybean, canola, rice bran and olive oils. The changes in total/HDL-cholesterol ratio are substantial when dairy and beef fat is replaced with oils rich in either polyunsaturated or monounsaturated fats.

### RECENT EPIDEMIOLOGICAL EVIDENCE

A pooled analysis of eleven cohort studies of dietary fat and coronary disease was recently published<sup>(7)</sup>. The Pooling Project examined the effect of replacing saturated fat with monounsaturated fat, polyunsaturated

fat, or carbohydrate on coronary heart disease risk using studies that met criteria for quality of dietary assessment, years of follow-up, and ascertainment of events. The main finding was that replacement of 5% of total energy from saturated fat with polyunsaturated fat was associated with a 13% reduction in risk of suffering a cardiac event and a 26% reduction in risk of death from heart disease.

So, the overall conclusion is that it is the type of fat in the diet and not the amount of fat that matters most for blood cholesterol and coronary heart disease risk.

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Murray Skeaff is an Associate Professor in the Department of Human Nutrition, University of Otago, Dunedin.



## New frontiers: A taste of the future for diet and cholesterol

by Peter Jones

Numerous foods and dietary factors have been proven to lower blood cholesterol. We have been researching a number of novel dietary factors that may have the potential to modulate cardiovascular disease risk.

### EMERGING DIETARY FACTORS

We have recently done some work looking at the effects of saponins on lipid levels. Saponins are compounds which are found in plant foods and rich sources include beans, alfalfa sprouts, spinach and sugar beet. A recently published study<sup>(1)</sup> investigated the effects of a specific group of saponins called platycodins from *Platycodon grandiflorum*, a garlic like root-based plant.

### The strategy of combining foods and specific dietary factors for cholesterol-lowering possesses huge potential

Hamsters were fed over 28 days an atherogenic diet enriched with platycodins at low (0.5% of diet) and high (1.0% of diet) levels. Compared to the control group, plasma cholesterol levels fell significantly but there was no effect on HDL-cholesterol, triglyceride, or blood glucose concentrations. The mechanism driving the cholesterol lowering seemed to be independent of cholesterol absorption or synthesis, and may be related to enhancing cholesterol clearance from blood. Follow up clinical trials are required to evaluate whether platycodins also have cholesterol lowering properties in humans.

Very importantly, we are looking at different fibre types that encourage fermentation in the gut. We have studied the effects of glucomannan, a water soluble fibre obtained from the tubers of *Amorphophallus konjac* (commonly called the konnyaku potato), which has a high fermentation value. When glucomannan is mixed with liquid it forms a very viscous gel that interestingly is commercially available in Japan.

We found that in non-diabetics, and people with Type 2 diabetes, glucomannan was able to elicit a LDL-cholesterol reduction over 21 days<sup>(2)</sup>. When plant sterols and glucomannan were combined an even larger cholesterol lowering effect was observed. Glucomannan is likely to be working as a pre-biotic where the non-digested soluble fibre is metabolised by bacteria, producing butyrate and other short-chain fatty acids which then pass to the liver and suppress the body's capacity to synthesise cholesterol.

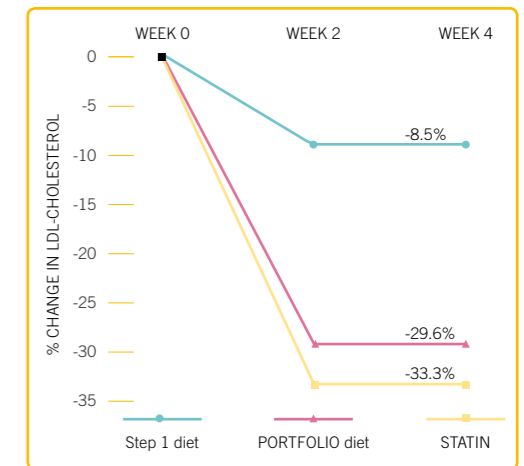
### COMBINING FOODS, THE PORTFOLIO DIET

This series of work started out with the goal of putting together several dietary factors to manage LDL-cholesterol levels. The portfolio diet<sup>(3)</sup> was designed to reduce body weight, saturated fat and dietary cholesterol intakes. This dietary strategy aimed at increasing intakes of soy protein, soluble fiber, nuts and plant sterols. When consumed over a month the

summation of all these factors led to a 30% reduction in LDL-cholesterol. The reduction was not statistically different from that achieved with a low dose statin in the same study, but delivered more pronounced results than the American Heart Association Step 1 diet as shown below. The strategy of combining foods and specific dietary factors for cholesterol-lowering possesses huge potential.

In summary, LDL-cholesterol concentrations can be lowered via dietary factors that act on different aspects of gastrointestinal and biliary trafficking of cholesterol absorption and synthesis. Plant sterols are one proven dietary component that can be combined with others to enhance cholesterol lowering effects. Countless future opportunities exist for reducing lipid levels and coronary heart disease risk through specific diet-derived components.

### CHOLESTEROL REDUCTION ACHIEVED WITH THE 'PORTFOLIO DIET'



Source: Jenkins et al., Am J Clin Nutr 2005

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Peter J. Jones is a Professor in the Departments of Food Science and Human Nutritional Sciences, and Director of the Richardson Centre for Functional Foods and Nutraceuticals at the University of Manitoba, Canada.

## Nutrition practice and beliefs of GPs treating elevated cholesterol: A survey by Michelle Gordon



*How often do GPs give dietary advice to their patients with elevated cholesterol and what kind of advice is it? The results of a new survey that addressed these important questions have just been released.*

Two hundred GPs completed an online questionnaire on their beliefs, attitudes and dietary advice practices when treating people with elevated cholesterol. The sample was drawn from a permission based panel of 1500 GPs, and quotas were set based on region to ensure the sample matched the distribution of GPs across rural and city locations in all Australian states. About two-thirds (68%) of the participants were male and almost half (43%) said they had a special interest in nutrition. The survey was commissioned by Unilever and is unpublished.

### **The top three food products GPs recommend to their patients with elevated cholesterol are fish oil, plant sterol-enriched spreads and oats**

Nearly all participating GPs (98%) give dietary advice when a patient is first diagnosed with hypercholesterolaemia. Surprisingly, more than two thirds (69%) report giving dietary advice 'every time' they see these patients. Nearly all the rest (27%) report doing so 'most times'.

The reason for this is easy to see – these GPs are convinced that diet therapy is an effective treatment strategy. Nearly two-thirds (61%) believe that dietary change has the greatest impact on reducing LDL-cholesterol levels, higher than prescription medication (18%) and exercise (9%). Nevertheless, diet therapy is seen as having limitations with few considering it 'very effective' (8%). The most commonly cited problems with diet therapy are lack of time (52%), difficulties with patient understanding and compliance (45%) and the belief that medication is more likely to lower cholesterol (40%).

Despite their belief in diet therapy, these GPs are referring patients to a dietitian only 'sometimes' (87%), and for most in a limited number of patient cases (77%). The main reasons for not referring more often to a dietitian are cost to the patient (82%), local availability (34%) and the belief that a dietitian will give the same advice as they would (43%).

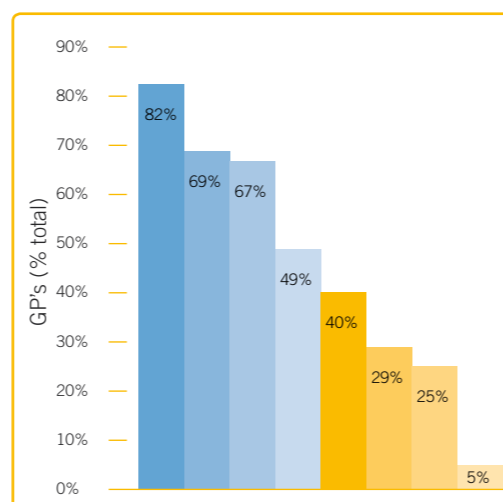
The dietary advice that GPs give is very likely to include a recommendation to consume a specific food or food product (94%). Despite the difference in their cholesterol lowering potential, the top three food products GPs recommend to their patients with elevated cholesterol are fish oil (70%), plant sterol-enriched spreads (65%) and oats (58%) as in the graph below. When asked about which foods can lower cholesterol, plant sterol-enriched foods scored highest (82%), followed by fish oil (69%) and then oats (67%).

The top three food products GPs recommend to their patients with elevated cholesterol are fish oil, plant sterol-enriched spreads and oats.

The findings of this survey indicate that when it comes to treating elevated cholesterol GPs do believe in the potential of nutrition therapy. However, it seems that there is more work to be done in helping them to provide the best advice and treatment for their patients.

*Michelle Gordon is a consultant dietitian. She has a passion for turning credible science into compelling communication for health influencers.*

#### **PROPORTION OF GPs (% OF TOTAL) WHO BELIEVE SPECIFIC FOODS LOWER CHOLESTEROL**



■ Plant sterol spread ■ Dairy foods with added plant sterols  
 ■ Fish oil ■ Healthy Heart breakfast  
 ■ Oats ■ Soy foods  
 ■ Psyllium ■ None of the above

## A GP's Perspective by Tony Helman



*This is an interesting survey, with an optimistic message about GPs' participation in dietary counselling for their hypercholesterolaemic patients.*

The sample in this survey seems to favour GPs with an interest in nutrition – the 43% who said they had a special interest in nutrition is at least double the proportion we might expect from various other studies of Australian GPs<sup>(1)</sup>.

This may explain one of the apparent contradictions in the results – that nearly two-thirds said diet advice was the most effective cholesterol-lowering strategy, compared with only 18% for prescription medication. Whilst this may be an expression of their enthusiasm, it is not what the objective research literature shows – that dietary change is likely to produce modest results in lowering serum cholesterol. Later on in the survey

But the idea that it is not worth referring because a dietitian will only give the same advice as the GP would is curious, to say the least. Perhaps they think that the diet for hyperlipidaemia is so standardised that they may as well just give patients a handout. This, of course, ignores the inconvenient truth that compliance sticks its problematic head in between giving someone advice and having them actually make long-term change. This is where a dietitian is ideally suited to help, with all the dietary detail, customisation and follow-up that they can offer. Dietitians may need to do more explaining to local GPs about what they actually do!

### **A dietitian is ideally suited to help, with all the dietary detail, customisation and follow-up that they can offer. Dietitians may need to do more explaining to local GPs about what they actually do!**

the GPs have obviously become a bit more realistic, with 40% of them stating that a barrier to giving diet advice is that "medication is more likely to lower cholesterol".

This is not to say that a better result will not be obtained if the patient includes a nutraceutical food product in their modified diet, such as a plant sterol-enriched spread, since this has a kind of pharmaceutical action in altering cholesterol handling within the gut. And even better if the diet is part of a more comprehensive lifestyle modification including exercise<sup>(2)</sup>.

It is interesting that most of the GPs recommend fish oils to such patients since, apart from lowering triglyceride levels, fish oil is likely to be effective largely by ameliorating the inflammatory and thrombotic steps in the atherosclerotic disease chain of events that makes hypercholesterolaemia a bad thing, rather than having any direct effect on the serum cholesterol<sup>(3)</sup>. Let's assume that this is what these GPs were thinking!

And then there is the low rate of referral to dietitians to consider. The top three reasons GPs gave for low referral were cost to the patient, lack of local availability and their belief that a dietitian will give the same advice as they would. Previous Australian research on this question had shown that cost to the patient was a major factor<sup>(4)</sup>, although the new Medicare arrangements to reimburse the cost of dietetic referral in complex chronic conditions may help. Given that there are probably only around 1,000 Australian dietitians in active private practice, local availability may well be an issue.

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