

The ultimate cholesterol lowering diet for your patient?

Elphee Medici

The Portfolio Diet is a powerful dietary intervention for cholesterol lowering. The combination of proven cholesterol lowering foods alongside a low saturated fat diet has yielded reductions in cholesterol levels similar to those observed with first generation statins. Elphee Medici, Registered Dietitian explores the scientific evidence and practical applications of the Portfolio Diet.

Cholesterol and Cardiovascular Disease

An elevated serum cholesterol levels – in particular low-density lipoprotein cholesterol (LDL-C) – is one of the main contributors to cardiovascular disease (CVD)¹. CVD remains the UK's number one killer with coronary heart disease (CHD) accounting for over 50% of deaths and an annual cost to the NHS of £3.2 billion¹.

Lowering the nation's cholesterol levels is a key factor in our aim to reduce CHD deaths through dietary, lifestyle and drug intervention¹.

- Around two thirds (60%) of adults have elevated serum cholesterol levels (>5mmol/l)^{1,3}.
- Prescription of statins cost the NHS £500 million in 2007².

The Portfolio Diet – a powerful weapon for cholesterol lowering

A number of foods are now widely recognised to individually lower blood cholesterol, in particular low-density lipoprotein cholesterol (LDL-C), by up to 14%⁴. The reduction of LDL-C is directly associated to reduced CHD risk and mortality. For every 1% drop in LDL-C there is an associated 2-3% reduced CHD risk^{5,6}.

The portfolio of cholesterol lowering foods	
Plant stanols and sterols	These lower cholesterol by interfering with biliary and dietary cholesterol absorption from the gut ⁷ .
Soluble (viscous) fibres including oats and beta-glucan ^{8,9}	The high viscosity of these fibres is thought to prevent cholesterol absorption from the gut and interfere with the bile acid pool.
Nuts , in particular almonds	These have a positive nutrient profile of mono-unsaturated fat, fibre and flavonoids which have been shown to lower cholesterol levels ¹⁰ .
Soya protein	This lowers LDL-C by down regulating hepatic LDL-C synthesis ^{9,11} .

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Portfolio Diet proven to lower LDL-C by up to 35%

In the late 1990's Jenkins' team suggested that a diet containing all of the cholesterol lowering foods would have the potential to lower cholesterol to the same level as first generation statins¹². As each food is thought to lower cholesterol via different metabolic pathways and sites in the body, Jenkins proposed that combining these foods creates an additive cholesterol lowering effect. The evidence for the Portfolio Diet is impressive¹³⁻¹⁸:

- **13%-35% drop in LDL-C depending on compliance to the diet**
- **24.9% reduced CHD risk and 23% reduced risk of death from CVD**

The scientific evidence

The first clinical trials investigating the impact of the Portfolio Diet were published in 2002-3 by the Jenkins team. Hyperlipidaemic subjects consumed around 2g plant sterols, 18g viscous fibres, 33g almonds and 30-46g soya protein alongside a low saturated fat and cholesterol diet for a period of one month. At the end of the trials, LDL-C reductions of 29%-35% ($p < 0.01$) from baseline were achieved which were significantly greater than following a low saturated fat and low cholesterol diet alone¹³⁻¹⁴.

Portfolio Diet and statins

Two further studies compared the impact of the Portfolio Diet against the first generation statin – lovastatin. Hyperlipidaemic patients were randomized to consume a low saturated fat and cholesterol diet alone or with 20mg lovastatin a day or the Portfolio Diet. After one month, significant drops in LDL-C were seen in all groups by 8%-8.5%, 30.9%-33.3% and 28.6%-29.6% respectively¹⁵⁻¹⁶. The Portfolio Diet's impact on LDL-C matched that of lovastatin and was significantly greater than the control diet.

How realistic is the Portfolio Diet?

The Portfolio Diet was tested under 'real-life' conditions in 66 free-living men and women aged 59 years with elevated cholesterol levels (LDL-C > 4.1 mmol/l). The portfolio foods were added to their established low saturated fat and cholesterol regimen for a period of 12 months. The study highlighted the significant impact of compliance to the diet's effectiveness in lowering LDL-C. Despite variability in compliance (40% achieving less than 55% compliance) an overall 13% reduction in LDL-C was achieved ($p < 0.001$) with the high compliant subjects (30%) achieving a 29.7% LDL-C reduction¹⁷.

The National Cholesterol Education Programme and American Heart Association have added viscous fibres, soya protein and stanols/sterols to their LDL-C treatment^{19,20}.

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What is the Portfolio Diet?

Cholesterol busting food	Daily intake	How to achieve the recommended intake
Low saturated fat diet	≤7% total daily energy intake	<ul style="list-style-type: none"> • Reduce: fatty and processed meats, hard cheese, cream, butter, chocolate, biscuits and cakes. • Choose: low fat dairy products, soya milk alternatives, olive/sunflower/rapeseed oils, fruit, nuts and seeds as snacks.
Plant stanols / sterols	2g	3 daily servings of products fortified with sterols/stanols. One serving is: <ul style="list-style-type: none"> • 2 tsp margarine/spreads • 1 yogurt • 1 glass milk or 1 mini yogurt drink which contains 3 servings.
Almonds	30g	Approx. 23 almonds.
Soluble fibre	20g	<ul style="list-style-type: none"> • 1 portion porridge or oat based cereal or oat/rye based bread/crackers + 1 serving pearl barley / beans / pulses / lentils AND • 5 servings of fruit and vegetables.
Soya protein	Start with 15g	1-2 servings: <ul style="list-style-type: none"> • 500ml soya milk – use on cereal, to make smoothies and in cooking. • A handful (28g) of soya nuts – great snack choice. • 80g fresh or frozen soya beans in a salad, stir fry or stew + 200ml flavoured soya shake. • 75g tofu – smoked and flavoured tofu pieces can be used in salads and stir fries. • 250ml glass soya milk + 125g soya yogurt + a 125g indulgent soya dessert.
	Progress to 25g	2-3 servings of soya foods: <ul style="list-style-type: none"> • 500ml soya milk + a handful of soya nuts. • 500ml soya milk + 125g soya yogurt + 125g soya dessert. • 250ml soya milk + handful (28g) soya nuts + 125g soya dessert. • 80g fresh or frozen soya beans + 125g soya yogurt + 200ml flavoured soya shake + 150ml soya custard. • 250ml soya milk + 75g tofu + 200ml soya shake.
	Increase gradually up to 45-50g	4-5 servings of soya foods per day: <ul style="list-style-type: none"> • 250ml glass soya milk + 100g tofu + handful (28g) soya nuts + 200ml flavoured soya shake + 125g soya dessert.

Practicalities of the Portfolio Diet

The diet's potential to lower LDL-C by 13%-35% clearly provides a powerful dietary solution to cholesterol lowering and reducing risk of CHD¹²⁻²⁰. For familial hyperlipidaemic and high risk patients, new generation statins are the main line treatment for LDL-C lowering^{1,21,22}. However, up to 40% of patients

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do not fully comply with their prescribed dose and compliance worsens with increasing dose and frequency²³. The Portfolio Diet has not only proven to significantly lower LDL-C but can also help high risk patients struggling to comply or who are unable to tolerate higher dose statins.

The Portfolio Diet is in stark contrast to UK consumption habits and this has to be borne in mind when encouraging a patient to adopt the regimen. In order to increase compliance, the introduction of 1 or 2 components of the diet at a time is advisable and as the patient's confidence and motivation improves more of the Portfolio foods can be added.

A low saturated fat diet with products fortified with plant stanols/sterols is a realistic start. Soya protein intakes in the diet may seem high, however, with more recent analysis of data demonstrating a cholesterol lowering effect from as little as 15g per day, it is advisable to introduce soya protein at this level i.e. 1-2 servings of soya foods per day to gradually build up the patient's acceptability²⁴. In addition, the taste barrier need no longer be of concern as soya foods have now become mainstream in the UK with greater choice and availability as well as significantly improved taste.

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