THE ULTIMATE CHOLESTEROL LOWERING PLAN©

Coronary Heart Disease (CHD) remains one of the major causes of morbidity and mortality in the UK and Ireland with significant costs to individuals' quality of life, health services and the economy. Improving dietary and lifestyle risk factors are critical if the situation is to be improved. This fact sheet discusses the Ultimate Cholesterol Lowering Plan© (UCLP©), an effective science-based dietary approach to lower serum cholesterol and for overall heart health.

In summary

- Improvements in CHD incidence have blunted in recent years with increasing obesity and Type 2 diabetes.
- Modifiable risk factors are driving CHD, in particular, hypertension, poor dietary habits and hypercholesterolaemia.
  - Over 50% of UK adults and almost 60% of Irish adults have high cholesterol levels.
- Dietary and lifestyle interventions are at the core of national and international CHD guidelines for both primary and secondary prevention.
- The UCLP© is a practical adaptation of the well-researched Portfolio diet associated with significant reductions in total (-12%), LDL (-17%) and non-HDL (-14%) cholesterol levels as well as a 13% reduction in 10-year CHD risk.
- The UCLP© is made up of a heart healthy foundation diet incorporating European and national evidence-based dietary guidelines including:
  - Lowering saturated fatty acid (SFA) intakes and partially replacing with poly and mono-unsaturated fat.
  - Increasing intakes of fibre, fruit and vegetables and sustainably sourced oil-rich fish.
- To the heart healthy foundation diet, the UCLP© introduces four specific plant foods, each proven to significantly lower serum cholesterol levels and when combined, result in a cumulative effect. The four foods are soya foods, foods fortified with plant stanols or sterols, tree nuts and peanuts, and beta-glucans.
- The key to the UCLP© is its ability to be adapted to meet any patient's individual preferences and motivational levels. Its flexibility provides the patient with complete autonomy to adopt the UCLP© at their own pace.

CHD status of the UK and Ireland

Over the past decade, there has been a significant reduction in deaths from Cardiovascular Disease (CVD) and in particular CHD.[1-5] This has been mainly driven by improved screening, use of statins and smoking cessation.[2] However, progress has begun to wane with increased life expectancy in conjunction with a growing prevalence of obesity and diabetes.[1-3] Thus, CHD remains a leading cause of premature deaths and morbidity in the UK and Ireland.

CHD prevalence, mortality and economic impact[6-8]

	UK	Ireland
Living with CHD ♥	2.3m	250,000
CHD deaths ♥	64,000	4,140
Healthcare costs €	€2.2bill	€158m
Cost to the economy €	€6.9bill	€498m

Risk factors for CHD[1,3,5,8]

Risk of CHD is dependent on multiple risk factors, modifiable and non-modifiable. Lifestyle intervention is now part of all CHD prevention guidelines, whether a patient is on lipid-lowering medication or not.[5,8,9]

NON-MODIFIABLE	Family history, age, ethnic background (in particular South Asian and Afro-Caribbean individuals).
MODIFIABLE	• Smoking • Hypertension • Dyslipidaemias • Diabetes (Type 2) • Being physically inactive • Overweight or obesity • Large waist circumference irrespective of body weight • Unhealthy dietary habits • Stress • Alcohol

93% of CHD deaths are attributable to modifiable risk factors; primarily hypertension, poor dietary habits and elevated serum LDL cholesterol.[8]

HEART UK
THE CHOLESTEROL CHARITY

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Elevated serum cholesterol and other blood lipids

More than 50% of UK adults[8] and an estimated 60% of Irish adults[10] have elevated total and LDL cholesterol levels

Poor diet, lifestyle and obesity (especially central obesity) remain major risk factors to elevated serum cholesterol levels and other dyslipidaemias as well as CHD risk. Dyslipidaemias are also caused by numerous medical conditions including familial hypercholesterolaemia (FH), familial hypertriglyceridaemia, metabolic syndrome and polygenic hypercholesterolaemia. FH is by far the most common genetic condition with an estimated prevalence of 1 in 250 people (including children).[11]

Recommended serum lipid levels

Lipid measure	Healthy adults[12]	Adults at high risk of CVD[5]
Total cholesterol	<5mmol/L	Individuals with existing cardiovascular disease, diabetes, chronic kidney disease, familial hypercholesterolaemia, markedly elevated single risk factors (BP≥180/110mmHg, LDL-C>4.9mmol/L and/or total cholesterol >8mmol/L) are classified as high risk. For such patients, an individualised assessment is required. Generalised target lipid levels are not applicable.
Non-HDL cholesterol	<4mmol/L	
LDL cholesterol	<3mmol/L	
HDL cholesterol	No specific levels set, but recommendations: >1mmol/L for men and >1.2mmol/L for women.	
Total cholesterol to HDL ratio	<6 lower risk. A level above 6 is associated with high risk, therefore the lower the figure the lower the risk.	
Fasting triglycerides	<1.7mmo/L	
Non-fasting triglycerides	<2.3mmol/L	

Plant-based diets leading the way to improved heart health outcomes

A wealth of scientific evidence now exists demonstrating a strong association between specific dietary patterns and a reduced risk of CHD and/or improved risk factors.[5,13] Such dietary interventions include the Mediterranean,[14] DASH[15] and Portfolio diet[16] which are predominantly based on plant foods and have reduced intakes of meat and animal products. The cardiovascular benefits of such diets have been attributed directly to food groups e.g. nuts, legumes, wholegrains, oil-rich fish and fruit and vegetables as well as the nutritional profile of the diets: low in saturated fatty acids (SFA), high in polyunsaturated fatty acids (PUFA) and fibres.

The Ultimate Cholesterol Lowering Plan© – beyond cholesterol lowering

The UCLP© was developed in 2011 in collaboration with HEART UK and leading health experts in diet and heart health.[17] The UCLP© is a pragmatic adaptation of the scientifically grounded Portfolio diet which has the potential to significantly lower LDL cholesterol, non-HDL cholesterol, apolipoprotein B, total cholesterol, triglycerides, systolic and diastolic blood pressure as well as C-reactive protein.[16]

Key findings from the Portfolio diet vs NCEP diet[16,18-20]

- Risk factors
  - -17% LDL cholesterol (p<0.0001)
  - -12% total cholesterol (p<0.001)
  - -14% non-HDL cholesterol (p<0.001)
  - -15% apolipoprotein B (p<0.0001)
  - -1% systolic (p=0.02) & -2% diastolic (p=0.006)
  - -32% C-reactive protein (p=0.008)
  - -13% estimated 10-year CHD risk (p=0.008)
- The portfolio can be used alongside lipid-lowering therapy including statins
- Improvements determined by:
  - Level of compliance:
    - Even at <50% compliance LDL cholesterol can be reduced by 12%
    - >90% compliance, LDL cholesterol reduced by 21%
- The four cholesterol-lowering foods:
  - Individually, have the potential to significantly lower LDL cholesterol by around 3-10%
  - When combined – result in an additive effect

The Portfolio diet's cholesterol-lowering and cardioprotective significance cannot be ignored, however, its "almost vegan" dietary approach does bring into question its practicality as an everyday approach for long-term adherence.

The UCLP© in three stages

The UCLP© brings the core principles of the Portfolio diet and its significant benefits, to a wider range of patients through its flexible and tailored approach. The UCLP© is made up of multiple dietary components, which individually have been proven to improve heart health outcomes and/or significantly lower cholesterol. The more of the components adopted by an individual, the greater the potential benefits. This allows the patient the autonomy to choose which and how many of the food components to select at any one time, thus accommodating different motivation levels and capabilities.

Step One – Optimising adherence

It is well established that long-term adherence to improved lifestyle habits is both complex and difficult to maintain.[21] The UCLP© utilises a combination of motivational interviewing (MI) and cognitive behavioural therapy (CBT) which are considered the most effective strategies to help motivate individuals to make and maintain dietary changes.[21-24]

Step Two – A heart healthy foundation diet

The UCLP© foundation diet brings together all key dietary adaptations associated with improved heart health outcomes in line with UK[25] and European heart health dietary recommendations.[5]

NOTE: Step two must be completed before progressing on to step three

Step Three – The four UCLP© foods

Once the heart healthy foundation diet has been established, the addition of any or all of the four UCLP© foods can help bring about further cholesterol reductions and heart health benefits. The UCLP© has adapted the recommendations made by the Portfolio diet.

- **Lower quantities of each of the four foods**
  Current research clearly demonstrates that cholesterol-lowering benefits can be achieved at lower and more practical daily doses than those recommended by the Portfolio diet.[26-29]
- **Incorporation of all four UCLP© foods is not mandatory to gain benefits**
  - Each of the four UCLP© foods have been proven to significantly lower cholesterol on their own. Thus, the patient can choose when, how many and which of the foods to introduce with the knowledge that any choice can help towards cholesterol-lowering and heart health benefits.[16]
  - The Portfolio research has clearly demonstrated that once combined, the four foods result in an additive cholesterol-lowering effect.[16] Thus, the more of the four foods incorporated into a heart healthy foundation diet the greater the potential benefits. This can act as a motivator for the patient to gradually introduce more of the foods.

The UCLP© is effective for those at low to high risk of CHD and can be used alongside lipid-lowering drug therapy including statins.[16] The degree of serum cholesterol reduction will vary significantly between individuals and will depend on:

- Baseline serum cholesterol levels – greater improvements observed with higher baseline levels.[30]
- Number of the UCLP© components adopted – greater improvements achieved with higher compliance.[16]
- Other cholesterol-lowering interventions e.g. whether they are on statins or not.[16]

The components of the UCLP©, as well as tackling hypercholesterolaemia, have been associated with multiple cardioprotective factors including lowering blood pressure, triglycerides, apolipoprotein B and C-reactive protein, as well as weight management and blood glucose control.[16,31]

How does the UCLP© differ from the Portfolio diet?

Portfolio Diet[16]	UCLP©[17]
Foundation heart healthy diet	
The US National Cholesterol Education Program Diet (NCEP) • 2,000kcal per day • <200mg dietary cholesterol • SFA ≤7% total energy	• Eatwell guide[25] • SFA ≤10% total energy and partly replaced with PUFA and mono-unsaturated fatty acids (MUFA) • No specific dietary cholesterol restrictions except in patients with familial hypercholesterolaemia or where all other possible dietary modifications have been made • Plant-proteins in favour of meat proteins - Red meat intakes no more than (500g cooked weight) per week and avoidance of processed meat - 80-100g beans or pulses daily • At least one weekly 140g serving of oil-rich fish • At least 5 portions of fruit and vegetables a day • High fibre and wholegrain foods – 3 servings daily
The four UCLP© foods	
• 45-50g soya protein	• ~25g soya protein
• 20g viscous fibres from oats, barley, psyllium, aubergine, okra, apples, oranges or berries	• 3g beta-glucan from oats or barley • *The heart healthy foundation diet will provide significant amounts of other viscous fibres from wholegrains, fruit and vegetables, and beans and pulses*
• 2g plant sterol enriched margarine	• 1.5g-3g plant sterol or stanol fortified foods including spreads, milk, yogurts, mini drinks and cereal bars
• 42g tree nuts or peanuts	• 28-30g tree nuts or peanuts

Step One: Tackling behaviour change

Changing established behaviour and maintaining healthy dietary habits over the long-term is not easy.[22] NICE guidelines call for behavioural interventions to assist patients in adopting and maintaining positive habits.[32]

A combination of MI and CBT to help motivate individuals to initiate and maintain dietary change has been shown to be more effective than either strategy on its own.[21-23,33,34] MI and CBT combined, result in a collaborative and guiding conversation between the patient and professional, which ultimately strengthens a person's own intrinsic motivation and commitment to behaviour change. With this style of consultation, the professional guides rather than leads the conversation, empathises with the patient and allows patient autonomy and freedom of choice.

A brief overview of key stages and skills

1) Establish rapport and initiate the patient's readiness, confidence and motivation to change behaviour.
   - Open-ended questions are used to elicit and explore a patient's barriers and motivators. Opening questions could explore what the patient's knowledge or beliefs are about their condition, the importance of improving dietary habits, what they have tried before and what has prevented them in the past as well as past successes etc.
   - Use of scales/rulers to identify their motivation levels e.g. *"From a scale of 1-10 how confident do you feel about improving your cholesterol?"* Then explore the reasons as to why they have chosen that number and not a higher number.
2) Provide reflective feedback: this focuses on repeating what the patient has verbalised and re-enforcing positive statements.
3) Provide advice/further insights – only after the professional asks for permission to do so. E.g. *"If I provide you with some options for improving your cholesterol, would that help?"*
4) Elicit affirmation from the patient that they have understood the advice and/or which changes they wish to make. With the guidance of the professional, the patient identifies which changes they wish to adopt and how they will achieve this e.g. if the goal is to reduce SFA, which specific foods will they switch/reduce.
5) Set realistic and flexible goals, and timelines to review their progress and/or self-review.
6) Tackle potential temptations on their journey and suggest different coping mechanisms.

Step Two: The ULCP© heart healthy foundation diet

1. Reducing intakes of SFA and partially replacing with PUFA or MUFA
2. Reducing red and processed meat
3. Importance of prioritising plant protein foods over animal proteins
4. Optimising oil-rich fish intakes
5. Achieving 5-a-day
6. Increasing wholegrain and fibre intakes

Reducing SFA intakes and partially replacing with unsaturated fatty acids, in particular PUFA

It is now well established that SFA intakes are linearly correlated to serum cholesterol levels, in particular LDL cholesterol.[5,35,36] The recent Scientific Advisory Committee on Nutrition report, which reviewed meta-analyses, systematic reviews and prospective cohort studies has confirmed that ***reducing intakes of SFA to no more than 10% of dietary energy (approximately 20g for women and 30g for men daily) or substituting with PUFA, MUFA or a mixture of the two (in randomised controlled trials (RCT)) reduces total and LDL cholesterol as well as CVD and CHD events.***[35] This is in agreement with the earlier 2018 World Health Organization draft report.[36]

One of the studies included was the Cochrane systematic review and meta-analysis of 11 RCTs demonstrating a 7-8% reduction in CHD events with lower intake of SFA compared with usual intake. Furthermore, substitution of SFA with PUFA resulted in a 24% lower risk of CHD events.[37]

Controversies over the association between SFA and CHD can be attributed to flaws in study methodologies, predominantly the lack of inclusion of confounders such as trans fat intakes and lack of clarity on which foods have substituted SFA intakes.[35]

Current intakes: SFA intakes remain above recommendations.[38,39]

Average UK adult (19-64 years) intakes of SFA, although reduced from 16% dietary energy intake in the mid-1990s to 11.9%, have remained static in recent years with 74.5% of 16-64-year olds and 83.3% of 65-year olds and older exceeding the recommendations. The average in children aged 4-18 years is 12.4-13% total energy.

In Ireland, adults' (18-64 years) mean intake has fallen from 13.9% total energy in 2001 to 13.3% in 2011. In adults over 64 years, mean SFA intake in 2011 was 14.3%; 35.5% of adults 18-64 years and 30.2% of older adults consumed <10% energy as saturates.

Meat and meat products, milk and milk products (predominantly cheese) and cereals such as pizza, biscuits, cakes, pastries and puddings are the key sources of SFA in the diet.

Reductions in red and processed meats

Meat, and especially processed meat, are key sources of SFA in the UK & Irish diet and salt for processed meat.[38,39] Additionally, high red and processed meat intakes have been directly associated with higher CHD incidence and mortality.[40-43] Current recommendations are to keep red meat intakes to no more than 500g (cooked weight) per week and avoid processed meat.[25,44]

Current intakes: In Ireland, adults (18-64 years) consume in excess of 120g red meat and meat products (processed) daily,[45] whilst in the UK the average adult (19-64 years) daily intake is 62g per day.[38] However, there is a significant range in intakes.

Prioritise plant food sources of protein

Diets based predominantly on plant-based proteins such as beans, pulses and nuts have a much more rounded nutrition profile compared with animal proteins: lower in SFA and energy density whilst providing PUFA and fibre, in particular fermentable fibres.[46-49] The more favourable nutrition profile has been attributed to better heart health outcomes.[14,16,50-53] A number of national dietary guidelines now prioritise plant-protein foods over animal proteins.[25,54-56]

Oil-rich fish

Oil-rich fish are low in SFA and more importantly, an excellent source of vitamin D and long-chain omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), both of which have been associated with improved cardiovascular health.[43,57-59] A recent Cochrane review questioned the heart health benefits of EPA and DHA supplements,[60] however, the evidence for consumption of oil-rich fish *per se* and reduced CHD incidence remains consistent. Analysis from the European EPIC cohort study has demonstrated a 20% reduced Ischaemic Heart Disease risk when 100kcal from red and processed meat was replaced with oil-rich fish.[43] Additionally, a meta-analysis of 7 large prospective cohort studies with over 170,000 subjects and an average follow up period of 13 years demonstrated a 5% reduced risk of heart failure associated with every 105g oil-rich fish per week.[58]

Current intakes: Oil-rich fish intakes are extremely poor in the UK with adults (19-64 years) consuming on average 56g per week,[38] which is just 40% of the recommended 140g weekly serving. Data for Irish intakes was not available.

With the current environmental issues, sustainably sourced fish should always be recommended.[44]

At least 5-a-day

Studies show that around 500g or 5 daily servings of fruit and vegetables is inversely related to CVD and even modest increases in intake can lead to improvements in risk.[1,61-63]

A systematic review demonstrated an 8% reduced risk of CHD mortality for every 200g of fruit and vegetables consumed – up to a threshold of 800g per day.[61]

Current intakes: around a third of UK[38] and Irish[64] adults consume 5 servings of fruit and vegetables daily with the majority consuming between 3 and 4 servings daily.

Wholegrains and fibre

Higher fibre and wholegrain intakes have been associated with improved serum lipid profiles and reduced risk of CHD mortality and morbidity.[65-69] A systematic review and meta-analysis found a 9% reduced CHD risk for every 7g of fibre consumed per day.[67] This was related to all fibre sources including fruit and vegetables and wholegrain cereals. A later meta-analysis found daily intakes of 25-29g fibre to be associated with a 24% reduced CHD incidence and improved lipid profile.[68]

Wholegrains are sources of B vitamins, and some minerals such as iron, magnesium, and zinc. Most importantly, wholegrains contribute significantly to fibre intakes and studies, although limited, do show a correlation between higher wholegrain intakes and improved serum lipid profiles as well as reduced CHD incidence and mortality.[67,68] 90g or three servings of wholegrains daily have been associated with a 19% reduced incidence of CHD.[65] This study also found a dose-response relationship which plateaued at 210g wholegrains per day.

Current recommendations for adults: 30g and ≥25g fibre per day for UK[70] and Irish[71] adults respectively. There are no specific recommendations for wholegrain foods *per se*.

Current fibre intakes: UK adults (19-64 years)[38] and Irish adults (18-64 years)[45] consume around 19g fibre daily which corresponds to 76% of Irish[71] and 63% of UK[70] dietary recommendations.

Step Three: The four UCLP© foods

Each of the foods have the potential to improve serum lipid profiles and when combined, will result in an additive effect.[16] Additionally, these foods can be used alongside lipid-lowering medication. This allows for a flexible adoption to meet different patient's motivation levels and abilities.

- Around 25g soya protein
- Fortified foods providing 1.5-3g plant stanol or sterol esters
- 3g beta-glucans from barley and/or oats
- 28-30g tree nuts or peanuts

These foods should be introduced only once the patient has established a heart healthy low SFA foundation diet.

Soya foods[72,73]

Soya foods provide a high-quality protein alternative to meat and animal proteins whilst being, in the main, low in SFA and a source of PUFA, fibre, vitamins and minerals.[46] This nutrition profile is conducive to better heart health outcomes. Additionally, soya as part of a low SFA diet, has been shown to significantly lower LDL and total cholesterol with health claims approved both in the US and Canada.[72-74]

A 2019 meta-analysis investigated the 46 randomised-controlled studies selected by the American Health Claims Authority for their review of the currently approved soya health claim.[72,73] The analysis included a total of 2,607 participants with a mean baseline total and LDL cholesterol of 5.85mmol/L and 3.82mmol/L respectively. The majority of studies used 25g daily soya protein (range 12-100g) intake for the intervention group (protein isolate powder, soya foods and drinks) with an average duration of 6 weeks. All studies without exception demonstrated a significant reduction in total and LDL cholesterol.

The analysis also confirmed this effect to be intrinsic and further reductions could be gained if the soya food consumed displaced higher SFA foods in the diet.

An average 25g soya protein daily intake over a 6-week period[73]
LDL cholesterol ↓ 3.2% (-1.9% to -4.5%) ↓ 0.12mmol/L (-0.07 to -0.17)
Total cholesterol ↓ 2.8% (-1.5% to -4.1%) ↓ 0.17mmol/L (-0.09 to -0.24)

No soya dose-response effect or threshold was found with the handful of studies using less than 25g soya protein. This concurs with an earlier meta-analysis of 35 clinical studies using intakes of 14-50g of soya protein per day.[75] The meta-analysis demonstrated a 3% reduction in LDL and a 2% reduction in total cholesterol as well as a 4% reduction in triglycerides with no dose dependent effect. Reductions in lipid profiles were significantly influenced by baseline levels.

Proposed mechanism of action:

Soya foods ability to lower cholesterol has been attributed to both the displacement of higher SFA animal proteins in the diet as well as intrinsically interfering with hepatic LDL-C receptors.[72,73,76]

Fortified foods providing 1.5-3g plant stanol or sterol esters daily

Plant stanols and sterols have a chemical structure similar to cholesterol and are naturally present in plant foods (vegetable oils, vegetable oil-based margarines, seeds, nuts, grain products, vegetables, legumes and fruits). Average diets contain small quantities: 17-24mg plant stanols and 2-600mg sterols daily.[77-80] Significantly higher quantities – 1.5-3g – are required to impact on serum cholesterol levels.[78,81,82] Thus, the need for plant stanol and sterol ester fortified products currently on the market. The wealth of evidence for the cholesterol-lowering effect resulted in the approved European health claim: *a daily intake of 1.5-3g plant sterol/stanol esters has been proven to lower serum cholesterol levels.*[82] *Intakes of 1.5-2.4g can lower LDL cholesterol by 7-10% whilst higher daily intakes of 2.5-3g can lower LDL cholesterol by 10-12.5%.*[82] The effect can be seen within 3 weeks.

Proposed mechanism of action:[79-81] *Plant stanols and sterols interfere with the transporter-mediated process for dietary and endogenous cholesterol uptake from the gut by displacing cholesterol from the mixed micelles. As mixed micelle formation is dependent on bile acid flow, plant stanol and sterol fortified foods are more effective when consumed with meals.*

3g beta-glucans from oats and/or barley

Beta-glucan is a viscous/soluble fibre found in significant quantities in oats and barley, which has been proven to lower serum cholesterol levels. The weight of evidence resulted in an approved European health claims in 2011[83] and 2012[84]: A 3g daily serving of barley or oat beta-glucan lowers cholesterol levels. Products providing a minimum of 1g beta-glucan per serving may carry the claim.

Two more recent meta-analyses of RCTs have added to the weight of the evidence. A meta-analysis of 58 RCTs with almost 4,000 participants demonstrated that an average daily intake of 3.5g oat beta-glucan over an average 6-week period reduces LDL and non-HDL cholesterol and apolipoprotein B by 4.2%, 4.8% and 2.3%, respectively.[85] For barley beta-glucan, a meta-analysis of 14 randomised trials with 615 participants demonstrated that consuming anything from 1.5-12g barely beta-glucan daily, over a 3-12 week period, reduced LDL and non-HDL cholesterol by 7%.[86]

Proposed mechanisms of action:[87]

- *Increases small intestinal gut viscosity and transit time to reduce cholesterol absorption.*
- *Microbiome fermentation of beta-glucan within the large intestine results in short-chain fatty acid production which interferes with cholesterol synthesis.*
- *Interference of bile acid entero-hepatic circulation.*

Tree nuts and peanuts - 28-30g per day

The beneficial nutrient profile of nuts and their cholesterol-lowering properties are well documented.[29,88-90] Recent meta-analyses and systematic reviews have confirmed the cardio-protective properties of consuming tree nuts and peanuts. [28,29,88-91]

A variety of nuts have been investigated including walnuts, almonds, cashews, Brazil nuts, macadamias, pistachios, pecans, hazelnuts and peanuts. All the meta-analyses concur that a 28-30g daily serving was associated with significant reductions in CHD risk,[28,29,88-91] improved endothelial function and significant reductions in total and LDL cholesterol as well as total to HDL cholesterol ratio. One meta-analysis expressed the overall reduction as a percentage rather than mmol/L: total cholesterol -5.1%, LDL cholesterol -7.4% and total to HDL ratio -5.6%.[89] Higher intakes, ≥60g, have been associated with greater lipid reductions.[29,91]

Given rising concerns over obesity, the high energy content of nuts may be a barrier to their recommendation and consumption but clinical evidence clearly demonstrates that regular nut consumption is not associated with higher body weight or weight gain.[29,90,91]

Proposed mechanism of action:[28,29,89] *the CHD reduced risk cannot be explained by the lipid-lowering effect of nuts alone and strongly indicates that dietary fibre, unsaturated fatty acids, vitamin E, naturally-occurring sterols/stanols, minerals and other bioactive ingredients may also benefit heart health through their anti-inflammatory action and improving epithelial fluidity.*

Conclusion

CHD remains a major cause of morbidity and mortality in the UK and Ireland and is largely driven by modifiable factors including poor dietary habits. The UCLP© is a dietary plan that encompasses current scientific evidence and international recommendations to help improve heart health and significantly lower serum cholesterol levels. The predominantly plant-based step-by-step approach is highly flexible and practical which means it can be tailored to meet any individual motivation levels and preferences. In addition, the incorporation of established behaviour change strategies, MI and CBT, helps to improve the motivation of individuals to adopt the UCLP© for the long-term.

The four UCLP© foods in practice

Soya protein – 25g daily

If an individual does not regularly consume soya foods, start with 15g soya protein (1-2 servings) per day and gradually build up to 25g (2-3 daily servings). A daily intake of 15g soya protein, when displacing meat or dairy, will improve the saturated fat to unsaturated fat profile of the diet.

	Serving size	g soya protein / serving
Marinated tofu pieces[92]	100g	17
Firm silken tofu[46]	100g	8
Soya mince, ready to use, raw[93]	100g	15-22
Young shelled edamame beans (fresh/frozen)[94]	80g	10
Roasted edamame (soya) beans[95]	35g	15
Soya drink (calcium fortified)[46]	250ml	8.5
Plain soya altern. to yogurt[96]	150g	6
Greek-style plain soya altern. to yogurt[97]	150g	9
Fruit flavoured soya altern. to yogurt[98]	125g	4.5

Achieving 25g soya protein daily

100g soya mince PLUS 250ml soya alternative to milk **OR**

80g young edamame beans PLUS 250ml soya altern. to milk PLUS 150g soya Greek-style altern. to yogurt **OR**

A handful (35g) of roasted soya beans PLUS 80g young edamame beans

Plant sterol or stanol fortified products* 1.5-3g daily

It is important not to exceed 3g plant sterol or stanols in one day. Products can provide anything from 0.54g up to 2g per serving, therefore, food labels should always be checked.

Should always be consumed with meals

	Serving size	g Stanol or Sterols per single serving	Max servings per day
Mini yogurt drinks*•	70 & 100g bottles	2	One-A-Day
Fruit & nut cereal bars•	40g (1 bar)	1.6	One-A-Day
Flavoured yogurts•	120g pot	2	One-A-Day
Fat spread*•	10g (2 tsp)	0.54 – 0.66	Three-A-Day
Skimmed milk*	250ml	0.54	Three-A-Day

*fortified with plant sterols[99] •fortified with plant stanols[100]

Any combination that does not exceed 3g plant stanols or sterols per day

**Sterol or stanol-containing products: should only be used if you need to lower your cholesterol levels. Consume as part of a healthy balanced diet, which contains 5 servings of fruit and vegetables. Are NOT APPROPRIATE for pregnant and breastfeeding women; or for children unless advised by a health professional.*

Tree nuts and peanuts – 28-30g daily

A handful of any (unsalted and unsweetened): walnuts, almonds, macadamias, pistachios, pecans, cashews, Brazil nuts, hazelnuts and peanuts.

Oat & Barley beta-glucans – 3g daily

Each of the following serving suggestions provide approximately 1g beta-glucan.*

Any 3 servings daily should provide the effective daily dose of 3g.[83,101]

- A bowl of porridge (using 30g dry oats or an individual sachet of instant porridge)
- 1 oat breakfast biscuit, e.g. Oatibix
- A serving (30-35g) oat-based breakfast cereals flakes
- 13g (1-2 tbsp.) oat bran – sprinkled onto cereals or added to casseroles, stews, soups and smoothies
- 3 oatcakes
- Any recipe providing at least 30g oats per single serving (and is low in saturated fat)
- 60g cooked pearl barley – in stews, casseroles and salads

*Beta-glucan content has been calculated using the average beta-glucan of whole oats and oatbran as per EU regulations[83] and manufacturer online or on pack specified oat and beta-glucan content.

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