



Position Statement On

Cholesterol

The Complete Health Improvement Program (CHIP) maintains that blood cholesterol levels are an important factor to consider in determining CVD risk, and promotes lifestyle choices that intend to lower this risk. Emphasis is given to foods that affect blood cholesterol levels, both in a desirable and undesirable manner. This paper discusses the role of saturated fat, trans fat and dietary cholesterol in their effect on blood cholesterol levels, and also addresses target levels for blood cholesterol, as well as the role of statins in managing blood cholesterol levels.

Key messages

- *CHIP recommends a plant-based wholefood eating pattern as much as possible, which results in a diet naturally low in saturated fat, trans fats, and dietary cholesterol, and higher intakes of protective dietary fiber, antioxidants and plant sterols.*
- *It is typically the same foods that contain high amounts of saturated fat (and some trans fat) that are also high in cholesterol. Thus, avoidance of foods high in saturated and trans fats typically results in decreases of dietary cholesterol.*
- *High levels of LDL cholesterol have been associated with a higher risk of cardiovascular disease (CVD).*
- *Reducing the amounts of saturated and trans fats, as well as dietary cholesterol, play a role in decreasing blood cholesterol levels, particularly LDL cholesterol levels.*
- *CHIP encourages participants to increase HDL levels through physical activity, however, as participants' overall risk for CVD decreases (as measured by other biomarkers), we are not concerned by drops in HDL.*

Cholesterol

CHIP maintains that blood cholesterol levels are an important factor to consider in determining CVD risk, and promotes lifestyle choices that intend to lower this risk. This link has recently been questioned, particularly in response to a 2010 meta-analysis showing that there is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD.[1] However, closer inspection reveals that there are certain limitations to this study (acknowledged by the authors) and also the conclusion that the health benefit depends on what replaces the dietary the saturated fat. The body of evidence still holds strong that a high intake of saturated fats is associated with higher levels of LDL cholesterol and higher risk of cardiovascular disease. [2, 3, 4, 5, 6, 7, 8, 9]

There is a strong body of evidence that changing the types of fat we eat can reduce our risk of heart disease. Reducing the amounts of saturated and trans fats, as well as dietary cholesterol, play a role in decreasing blood cholesterol levels, particularly LDL cholesterol levels. This finding is based on a wide research base, including coronary heart disease (CHD) morbidity and mortality data from epidemiological studies as well as

controlled clinical trials (using CHD events and death). It is important to note that a new study does not automatically annul the research papers that came before it.

As foods that are typically high in saturated fats and trans fats also contain other constituents linked with a higher risk of disease, and lack factors that are protective, CHIP recommends to reduce foods of animal origin, including meats, dairy and eggs, and to eat a wide variety of wholefood plant-based foods, including whole grains, fruit and vegetables, but also legumes and some nuts and seeds. By doing this the diet will be naturally low in saturated fat, trans fats, and dietary cholesterol, and while dietary fat tends to decrease in general, saturated fat is also replaced by polyunsaturated fats and unrefined carbohydrates. Furthermore, whole plant-based foods are sources of dietary fiber, antioxidants and plant sterols, which are all associated with better health outcomes.

This is reflected in the biomarkers tracked in participant throughout a CHIP program. CHIP participants typically experience a 10-15% drop in LDL cholesterol within the first 30 days of the program. Persons being treated for high cholesterol may decrease and sometimes eliminate their need for medication. Results show that those with the highest cholesterol levels – and greatest risk- achieve the greatest results. [12]

Saturated fat

High intakes of saturated fat, typically found in animal products such as meats, eggs and dairy, has been linked to increases in blood LDL cholesterol levels. However, reducing saturated fat and replacing it with refined carbohydrates (e.g. some low fat dairy products that contain starches and sugars to achieve a similar mouth feel and taste as their full cream counterparts) is not associated with a reduced risk for CVD. According to the body of evidence, saturated fat needs to be replaced by either unsaturated fatty acids or unrefined carbohydrates. [10, 11]

Trans fats

Trans fats are said to be particularly detrimental to heart health as they increase LDL cholesterol, more so than saturated fats, and they also lower HDL cholesterol. Trans fats occur in products that make use of partially hydrogenated vegetable oils, such as margarines and cookies, and animal products, which have naturally occurring trans fats (such as red meats, dairy products, and butter). Both types are bad for the heart.

It should be noted that, in some countries, hydrogenation is no longer used in margarines, and polyunsaturated oils and those items contain negligible trans fats as they have not undergone hydrogenation. Nonetheless, the types of products that contain such oils tend to be overly processed and can contain higher amounts of fat and refined carbohydrates, so CHIP still recommends to avoid these products.

Total Cholesterol Intake

CHIP recommends reduced intakes of dietary cholesterol, particularly for people whose blood cholesterol is in the higher levels. While saturated fat and trans fat have been shown to have a much higher impact, dietary cholesterol, which is found only in animal products (including meats, poultry, dairy and eggs), also increases blood cholesterol levels.

While dietary recommendations may not propose a specific upper limit for dietary cholesterol intake, reducing dietary cholesterol – along with reducing saturated and trans fat – is still commonly recommended as part of an overall heart healthy diet by leading bodies in heart health. [13, 14, 15] It should also be noted that there is no need to consume dietary cholesterol, as the body is able to produce cholesterol intrinsically.

Some recently published papers question the relationship between dietary cholesterol and cardiovascular disease risk [16] and call to reconsider dietary cholesterol recommendations. There is evidence for an association between dietary cholesterol, egg consumption and increased CVD risk among older, community-

dwelling adults with type 2 diabetes. [17] As the majority of CHIP participants tend to be of an older age group, with many being diagnosed with prediabetes or diabetes, CHIP opts for the safe and do-no-harm route of recommending to reduce intake of dietary cholesterol, including eggs.

CHIP recommends a dietary pattern of mostly plant-based wholefoods. Not only are these foods free from dietary cholesterol and trans fats, they are also mostly lower in saturated fat. Furthermore, many plants contain protective compounds such as plant fiber and plant sterols that can help lower blood cholesterol levels. CHIP recommends participants aim for the following blood cholesterol levels:

- Total cholesterol: < 160mg/dL (4.2mmol/L)
- LDL cholesterol: < 90mg/dL (2.3mmol/L)

CHIP encourages participants to lower their total and LDL cholesterol through better lifestyle choices in both eating and activity behaviors. Compared to some newly published guidelines, CHIP's LDL-C target of < 90mg/dL (2.3mmol/L) is relatively lenient and may be reviewed in the future. In regards to total cholesterol, commonly recommended levels are <200mg/dL (5.5 mmol/L). [18] We believe that there is sufficient evidence to suggest that additional benefits can be obtained aiming for lower targets of < 160mg/dL (4.2mmol/L). We believe that both the CHIP LDL and total cholesterol targets are achievable by most people using lifestyle modifications. In regards to cholesterol lowering medications, CHIP advises participants to work closely with their physicians about making changes to their medication regime.

HDL cholesterol

Low levels of high-density lipoproteins (HDL) are considered an important risk factor for CVD. Commonly recommended levels for HDL are >40mg/dl (1 mmol/L). Paradoxically, lifestyle interventions that promote low-fat, plant-strong eating patterns lead to lower CVD risk, but also tend to reduce HDL levels. Furthermore, some people with coronary atherosclerotic events have normal or even elevated HDL levels [19], and some studies have shown that pharmacologically raised HDL does not always correlate with reductions in CVD risk. [20, 21]

Consequently, we feel that this raises the question whether using HDL levels as a predictor of CVD risk is of value, particularly in populations not consuming a typical western diet. [22] This topic is discussed further by Kent et al. in a recently published paper in *Nutrition & Metabolism*, using data from CHIP programs. [22] Further research is required to inform public guidelines on HDL targets. In the interim, CHIP encourages participants to increase HDL levels through physical activity, however, as participants' overall risk for CVD decreases (as measured by other biomarkers), we are not concerned by drops in HDL.

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