

# openheart It is time to stop counting calories, and time instead to promote dietary changes that substantially and rapidly reduce cardiovascular morbidity and mortality

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Most heart attacks and ischaemic strokes are caused by complicated atheroma usually compounded by thrombosis suddenly reducing blood flow in a critical artery. Extensive evidence suggests that this atheroma silently builds up over many decades. However, arterial stiffening can be seen even in children who are obese, and aortic fatty streaks are visible in some teenagers and young adults.<sup>1</sup> Yet, most cardiovascular events do not manifest until after the age of 60 years. The general perception is thus of a slow process that will therefore only reverse slowly, if at all. However, this perception is wrong. Extensive empirical and trial evidence reveals that substantial reductions in mortality can occur within months of quitting smoking, or making healthy dietary changes. These reductions apply to both individuals and to entire populations. In one American hospital, admissions for acute coronary syndromes decreased by 40% within 6 months of the introduction of local smoke free legislation.<sup>2</sup> When the law was rescinded, coronary admissions rapidly returned to previous levels. The introduction of smoke-free legislation in Scotland in 2006 was soon followed by a 6% decrease in out of hospital cardiac deaths and a 17% decrease in hospital admissions within a year.<sup>3</sup> Even 30 min of second-hand smoke exposure has been proven to increase platelet activity and hence elevate cardiovascular risk.<sup>4</sup>

Similarly, changes in diet can rapidly improve outcomes of cardiovascular disease (CVD), as demonstrated by several randomised trials. In the DART trial, 2033 survivors of myocardial infarction who were advised to eat fatty fish had a significant 29% reduction in all-cause mortality compared with control patients, with survival curves separating within months. Likewise, in the Gruppo Italiano per lo Studio della

Sopravvivenza nell'Infarcto Miocardico (GISSI)-Prevention trial, 1 g of  $\Omega$ -3 fatty acids significantly reduced all-cause mortality and cardiovascular mortality in 11 324 myocardial infarction survivors. Moreover, survival curves separated early, with a significant reduction in total mortality after just 3 months of treatment ( $p=0.037$ ).<sup>5</sup>

The PREvencion con DIeta MEDiterranea (PREDIMED) primary prevention randomised controlled trial found that an energy unrestricted diet supplemented with extra virgin olive oil or nuts achieved an impressive 30% reduction in major cardiovascular events (NNT=61) in over 7500 high risk individuals initially free of CVD. This reduction occurred within 3 months.<sup>6</sup> Furthermore, this solid RCT evidence builds on a wealth of existing data from observational, cohort and secondary prevention intervention studies.<sup>7,8</sup> It also provides further strong causal evidence that simple diet interventions can rapidly and powerfully reduce CVD outcomes. In comparison with an American Heart Association recommended 'low fat' diet, a Mediterranean diet post myocardial infarction is a more powerful coronary intervention tool for mortality than aspirin, statins, or coronary stents, but without any significant difference in total cholesterol, triglycerides or HDL between the two groups.<sup>9</sup> It is the abundant  $\alpha$ -linoleic acid, polyphenols and  $\Omega$ -3 fatty acids found in nuts, olive oil, oily fish and vegetables, that rapidly exert positive health effects by attenuating inflammation, atherosclerosis and thrombosis.<sup>10</sup> Conversely, the consumption of trans-fats commonly found in fast food can rapidly increase C reactive protein and other inflammatory markers within weeks.<sup>11</sup>

Strategies that prevent excessive weight gain in children and adults through curbing the consumption of the amounts of unhealthful foods should also be welcomed. However,

simply focusing on weight loss in obese subjects misses a key finding from analysis of PREDIMED subgroups: dietary intervention achieved consistently large reductions in CVD risk irrespective of weight. Furthermore, weight loss interventions are rarely sustained. The weight loss industry, which emphasises calorie restriction over good nutrition, generates \$58 billion in revenue annually in the USA, even though long-term follow-up studies reveal that the majority of individuals regain virtually all of the weight that was lost during treatment irrespective of whether they maintain their diet or exercise programme.<sup>12</sup> Shifting focus away from calories and emphasising a dietary pattern that focuses on food quality rather than quantity will help to rapidly reduce obesity, related diseases and cardiovascular risk.<sup>13 14</sup> Rapid weight loss and regain that can occur from fad dieting is actually detrimental to health. Such ‘weight cycling’ contributes to hypertension, insulin resistance and dyslipidaemia resulting in increased mortality risk and worse cardiovascular outcomes.<sup>15</sup> The look AHEAD (Action for Health in Diabetes) trial found no reduction in the composite endpoint (ie, death from cardiovascular causes, non-fatal myocardial infarction, non-fatal stroke, or hospitalisation for angina) with a low calorie diet (on top of increased physical activity) in patients with type 2 diabetes despite a maximum follow-up of 13.5 years and despite significant weight loss in the intervention group.<sup>16</sup>

In a randomised, controlled, double-blinded dietary intervention trial for blood pressure, compared to placebo, the daily ingestion of flaxseed (high in  $\Omega$ -3, lignans and fibre) induced a significant 10 mm Hg systolic/7 mm Hg diastolic blood pressure reduction in hypertensive patients with peripheral arterial disease, within 6 months. The rate of stroke and myocardial infarction was cut in half in the flaxseed group compared to the placebo group. Furthermore, there was no significant difference in weight change between the two groups.<sup>17</sup>

The American Heart Association predicts that 8 million Americans will have heart failure by 2030. The total direct costs will triple from approximately \$20 billion in 2012 to \$70 billion in 2030.<sup>18</sup> Recently, a small study suggested that a low-carbohydrate diet in patients with diabetes reversed echocardiographic markers of diastolic dysfunction within weeks of implementation.<sup>19</sup> This finding is all the more valuable considering there is, to date, no proven pharmacological intervention that improves prognosis in diastolic heart failure, which affects 30–50% of all heart failure patients.<sup>19</sup>

An exaggerated belief in the (modest) benefits of pharmacotherapy,<sup>20</sup> aggressively reinforced by commercial vested interests, can often mislead patients and doctors, and promotes overtreatment in chronic disease management, and may even distract from and undermine the benefits of simple lifestyle interventions.

Focusing on total energy consumed, as opposed to nutritional value, has been exploited by the food industry, which has added sugar to over 80% of all processed foods. One can of cola contains nine teaspoons of sugar.

The EPIC study revealed that one can a day (approximately 150 calories) was associated with substantially increasing the risk of developing type 2 diabetes.<sup>21</sup> Conversely, PREDIMED revealed that consumption of a handful of nuts, (30 g of walnuts, 15 g of almonds and 15 g of hazelnuts) or four tablespoons of extra virgin olive oil per day (approximately 500 calories) significantly reduced the risk of heart attack and stroke. A recent randomised pilot study of a *calorie unrestricted* very low carbohydrate/high fat diet in overweight patients with type 2 diabetes or prediabetes resulted in a significant improvement in glycaemic control and even discontinuation of diabetes medications within 3 months in comparison to a moderate carbohydrate, low-fat calorie-restricted diet (consistent with guidelines from the American Diabetes Association), with no adverse effect on blood lipids.<sup>22</sup> A critical review in Nutrition also concluded that dietary carbohydrate restriction is the “single most effective intervention for reducing all of the features of the metabolic syndrome” and should be the first approach in diabetes management with the very low carbohydrate ketogenic diet (<10% carbs) revealing the greatest falls in glycated hemoglobin and reduction in the use of medications with benefits occurring even without weight loss.<sup>23</sup>

Primary and secondary care clinicians clearly have a duty to their individual patients and also to their local populations. Our continued collective failure to act is an option we cannot afford. Obesity alone is already costing the National Health Service (NHS) over £5 billion a year. Total costs of type 2 diabetes in the UK exceed £20 billion and are predicted to double in the next 20 years.<sup>24</sup> Similarly, in the USA, the cost of diabetes has risen 40% in the past 5 years, reaching \$245 billion in 2012.<sup>25</sup> The extensive Global Burden of Disease studies show that poor diet is consistently responsible for more disease and death than physical inactivity, smoking and alcohol combined.<sup>26</sup> This global disease burden will clearly not be prevented by medications; it will require policy interventions that make healthier diet choices easier (the ‘default option’).<sup>27</sup> The most powerful and effective policies include taxation on sugary drinks, and subsidies to increase the affordability and availability of healthier foods including nuts, vegetables and fruit, in addition to controls on the marketing of junk foods and clear package labelling. Increasing nut consumption among the American population by two servings per week could prevent 90 000 CVD deaths per year.<sup>28</sup> Applying these population-wide policies might achieve rapid reductions in disease and hospital admissions visible even within the electoral term of most politicians. It is time to stop counting calories, and time to instead promote good nutrition and dietary changes that can rapidly and substantially reduce cardiovascular mortality. The evidence indeed supports the mantra that “food can be the most powerful form of medicine or the slowest form of poison”. Recommending a high fat Mediterranean-type diet and lifestyle to our patients, friends and families, might be a good place to start.

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