

Low carbohydrate diets: going against the grain

Low carbohydrate high fat (LCHF) diets continue to attract media attention, despite a substantial body of evidence showing that a range of dietary patterns promote health and reduce risk of chronic disease. LCHF diets invariably involve radical restriction of total carbohydrate (typically <12% of energy intake) and largely unrestricted intakes of foods rich in saturated fat. Support for LCHF diets has been partly fuelled by the publication of some papers apparently suggestive of benefit.¹⁻³ Recent evidence, however, confirms the established cornerstones of dietary advice—reduce saturated fat, free sugars, and sodium and increase wholegrain cereals and fibre—although changing disease patterns and additional data have necessitated some changes in emphasis.⁴⁻⁶

One important change has been the acceptance of a wider range of macronutrients than previously recommended for the prevention and treatment of obesity and associated chronic diseases.⁴ This change has enabled the translation of nutritional recommendations into dietary patterns as diverse as Mediterranean diets, which include up to 40% of energy intake from fat mainly derived from unsaturated vegetable oils, and Asian-style diets, which might contain up to 70% of energy as carbohydrate. Whatever the total fat intake, epidemiological, experimental, and clinical trial evidence supports lowering blood cholesterol by partially substituting unsaturated fat for saturated fat.^{5,7-9} Reduction of conventional cardiovascular risk factors, including blood cholesterol, has contributed to dramatic declines in death rates from coronary heart disease in most western countries during the past 30–40 years.¹⁰ Thus, it is a cause for concern that in areas of Sweden where the uptake of LCHF diets has been particularly prevalent, population blood cholesterol levels have risen in parallel with an increase in saturated fat intakes.¹¹

Much of the justification for the use of LCHF diets stems from studies of fairly short duration (typically 6 months) that have shown benefit in terms of weight reduction and improvement in biomarkers for cardiovascular disease and diabetes.¹² However, trials of at least 12 months' duration show that compliance with energy restriction is the main determinant of sustained weight loss, with no clear merit of LCHF diets over diets of different macronutrient composition.¹³ Systematic reviews and meta-analyses commissioned by WHO have confirmed

the importance of free (added) sugars¹⁴ and total fat intake¹⁵ when consumed ad libitum in contributing to excess body fatness. These findings have informed the strong draft recommendations from WHO¹⁶ and the UK's Specialist Advisory Committee on Nutrition (SACN)⁶ that intake of free sugars should be radically reduced from present levels of intake. Recent recommendations have extended the acceptable upper limit of total fat intake to 35–40% of total energy.^{4,17} Although fairly high intakes of total fat from nuts, seeds, and unsaturated vegetable oils can reduce cardiovascular risk,⁷ lowering fat intake to 30% or less of total energy might help to prevent weight gain in populations with high rates of obesity and diabetes.¹⁵

Other than the need to restrict consumption of free sugars, limited attention has been paid to the type of dietary carbohydrate and the justification for a recommended range of dietary intakes. In many countries, grains are heavily processed and white rice and potatoes provide a high proportion of total carbohydrate calories. Such carbohydrates are rapidly digested, absorbed, and metabolised, and have predominated in many studies that purport to show adverse metabolic effects when high and low carbohydrate intakes have been compared.¹² By contrast, diets rich in fibre from wholegrains, pulses, fruit, and vegetables have been shown to be protective against type 2 diabetes, colorectal cancer, and cardiovascular disease.⁶ Randomised trials have shown that diets high in such carbohydrates can substantially reduce risk of progression of prediabetes to diabetes and cardiovascular disease.¹⁸ Thus, consumption of appropriate carbohydrate sources is recommended rather than carbohydrate restriction. The SACN report suggests that carbohydrate should principally be derived from vegetables, fruits, and wholegrains, mean adult intakes of dietary fibre should increase to 30 g per day, and the population should derive about half of total calories from carbohydrate.⁶ Nordic recommendations suggest similar foods to provide total carbohydrate intakes ranging between 45% and 60% total energy,⁴ which is broadly comparable to the recommendations of a WHO scientific update on carbohydrates.¹⁹

Public health initiatives to promote health and reduce risk of chronic disease will be advanced by the recognition that a range of dietary patterns supported by strong evidence-based research on nutrients and foods are



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acceptable. This does not include a LCHF diet. Several features are common to recommended dietary patterns; these include increased consumption of fruits, vegetables, nuts, legumes, fish, unsaturated oils, and low fat dairy foods. Cereal-based foods should be predominantly wholegrain and minimally processed. Restriction of saturated fat and sodium continue to be advised. Fad diets often arise from the publication of a few studies that seem to contradict conventional wisdom. Urgent headline appeals to overturn dietary recommendations on such limited evidence can harm public health.

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Polio endgame management: focusing on performance with or without inactivated poliovirus vaccine

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In *The Lancet*, Jacob John and colleagues¹ report results from a randomised trial of 450 children from Vellore, India, aged 1–4 years that assessed the effects of giving a dose of inactivated poliovirus vaccine (IPV) to children previously immunised with five or more doses of oral poliovirus vaccine (OPV) at least 6 months before the study. The results confirm that an extra dose of IPV in this population increases serum antibodies.² The study goes further to show that the IPV dose boosts individual intestinal immunity in OPV-vaccinated children, at least for a short period of time.¹ Specifically, the results show that 7 days after a bivalent OPV challenge dose, 27 (12%) and 17 (8%) of children in the IPV group shed serotype 1

and 3 poliovirus, respectively, compared with 43 (19%) and 57 (26%) of children in the group that did not receive IPV before challenge. Leaders of immunisation programmes might find these results helpful as they consider the role of IPV in their present and future immunisation programmes.³

If all goes well with current efforts at polio eradication, countries will soon achieve and maintain the goal of stopping transmission of all wild polioviruses contemporaneously. This occurred for serotype 2 in 2000 and might have occurred for serotype 3 (last case reported globally in November, 2012⁴). Successful global eradication of all wild poliovirus will allow coordinated cessation of