Reducing Cardiovascular Disease Risk with Therapeutic Carbohydrate Restriction

'It is time to stop counting calories, and time instead to promote dietary changes that substantially and rapidly reduce cardiovascular morbidity and mortality' *Malhotra et al. (2015)*

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Systematic Reviews and Meta-analyses

1. Gjuladin-Hellon T, Davies IG, Penson P, Amiri Baghbadorani R. Effects of carbohydrate-restricted diets on low-density lipoprotein cholesterol levels in overweight and obese adults: a systematic review and meta-analysis. Nutr Rev. 2019;77(3):161-180. doi:10.1093/nutrit/nuy049

2. Dong T, Guo M, Zhang P, Sun G, Chen B. The effects of low-carbohydrate diets on cardiovascular risk factors: A meta-analysis. PLoS ONE. 2020;15(1):e0225348. doi:10.1371/journal.pone.0225348

3. Santos FL, Esteves SS, da Costa Pereira A, Yancy WS, Nunes JPL. Systematic review and meta-analysis of clinical trials of the effects of low carbohydrate diets on cardiovascular risk factors. Obes Rev. 2012;13(11):1048-1066. doi:10.1111/j.1467-789X.2012.01021.x

Studies

1. Wood RJ, Volek JS, Davis SR, Dell'Ova C, Fernandez ML. Effects of a carbohydrate-restricted diet on emerging plasma markers for cardiovascular disease. Nutr Metab (Lond). 2006;3:19. doi:10.1186/1743-7075-3-19

2. Harvey CJ d C, Schofield GM, Zinn C, Thornley SJ, Crofts C, Merien FLR. Low-carbohydrate diets differing in carbohydrate restriction improve cardiometabolic and anthropometric markers in healthy adults: A randomised clinical trial. PeerJ. 2019;7:e6273. doi:10.7717/peerj.6273

3. Athinarayanan SJ, Hallberg SJ, McKenzie AL, et al. Impact of a 2-year trial of nutritional ketosis on indices of cardiovascular disease risk in patients with type 2 diabetes. Cardiovascular Diabetology. 2020;19(1):208. doi:10.1186/s12933-020-01178-2

4. Unwin DJ, Tobin SD, Murray SW, Delon C, Brady AJ. Substantial and Sustained Improvements in Blood Pressure, Weight and Lipid Profiles from a Carbohydrate Restricted Diet: An Observational Study of Insulin Resistant Patients in Primary Care. International Journal of Environmental Research and Public Health. 2019;16(15):2680. doi:10.3390/ijerph16152680

What about Fat?

1.Zhu Y, Bo Y, Liu Y. Dietary total fat, fatty acids intake, and risk of cardiovascular disease: a dose-response meta-analysis of cohort studies. Lipids in Health and Disease. 2019;18(1):91. doi:10.1186/s12944-019-1035-2

2. Shih CW, Hauser ME, Aronica L, Rigdon J, Gardner CD. Changes in blood lipid concentrations associated with changes in intake of dietary saturated fat in the context of a healthy low-carbohydrate weight-loss diet: a secondary analysis of the Diet Intervention Examining The Factors Interacting with Treatment Success (DIETFITS) trial. Am J Clin Nutr. 2019;109(2):433-441. doi:10.1093/ajcn/nqy305

3. Mozaffarian D, Rimm EB, Herrington DM. Dietary fats, carbohydrate, and progression of coronary atherosclerosis in postmenopausal women. Am J Clin Nutr. 2004;80(5):1175-1184. doi:10.1093/ajcn/80.5.1175

4. Astrup A, Magkos F, Bier DM, et al. Saturated Fats and Health: A Reassessment and Proposal for Food-based Recommendations: JACC State-of -the-Art Review. Journal of the American College of Cardiology. Published online June 17, 2020. doi:10.1016/j.jacc.2020.05.077

Other measurements

1. Hu T, Jacobs DR, Bazzano LA, Bertoni AG, Steffen LM. Low-carbohydrate diets and prevalence, incidence and progression of coronary artery calcium in the Multi-Ethnic Study of Atherosclerosis (MESA). British Journal of Nutrition. 2019;121(4):461-468. doi:10.1017/S0007114518003513

2. Chen C-Y, Huang W-S, Chen H-C, et al. Effect of a 90 g/day low-carbohydrate diet on glycaemic control, small, dense low-density lipoprotein and carotid intima-media thickness in type 2 diabetic patients: An 18-month randomised

controlled trial. PLOS ONE. 2020;15(10):e0240158. doi:10.1371/journal.pone.0240158

Lean Mass Hyper-Responders

1. Norwitz, N.G. *et al.* (2021) 'Elevated LDL Cholesterol with a Carbohydrate-Restricted Diet: Evidence for a "Lean Mass Hyper-Responder" Phenotype', *Current Developments in Nutrition*, 6(1), p. nzab144. Available at: https://doi.org/10.1093/cdn/nzab144.

2. Soto-Mota, A. *et al.* (2024) 'Increased LDL-cholesterol on a low-carbohydrate diet in adults with normal but not high body weight: a meta-analysis', *The American Journal of Clinical Nutrition*, p. S0002916524000091. Available at: https://doi.org/10.1016/j.ajcnut.2024.01.009.

3. Budoff, M. *et al.* (2024) 'Carbohydrate Restriction-Induced Elevations in LDL-Cholesterol and Atherosclerosis', *JACC: Advances*, 3(8), p. 101109. Available at: https://doi.org/10.1016/j.jacadv.2024.101109.

4. Soto-Mota, A. *et al.* (2025) 'Plaque Begets Plaque, ApoB Does Not', *JACC: Advances*, 0(0). Available at: https://doi.org/10.1016/j.jacadv.2025.101686.

Further resources

The metabolic section of the Nutrition Network reference resource has an extensive listing where you can read more about the application of therapeutic carbohydrate restriction (TCR) cardiovascular disease risk and other associated conditions.

Nutrition Network offers training modules where you can learn more about the science and application of TCR for human health.

Individual responses to dietary composition can vary so appropriate medical monitoring is advised. Patients who are taking medication should consult with their doctor as the following clinical guidelines (Society of Metabolic Health Practitioners - Hite et al.) may need to be considered.