COALITION FOR METABOLIC HEALTH

Rethinking Nutrition in Type 2 Diabetes to Change the Disease Trajectory

Impacting more than **30 million** Americans, [1] type 2 diabetes (T2D) is a **leading cause** of cardiovascular disease, kidney failure, blindness, and premature death. [2,3,4,5]

Despite decades of investment in new medications and care models, the disease remains progressive for most, and the promise of remission is rarely realized in routine care.[3,4]

Yet a growing body of evidence suggests that the metabolic dysfunction driving T2D is modifiable – with low-carbohydrate and ketogenic therapies (diets typically defined as less than 130 grams of total carbohydrates per day and less than 50 grams of total carbohydrates per day, respectively) emerging as effective strategies to improve outcomes.

A Growing and Shifting Burden

T2D is expanding across both prevalence and severity, with particular concern around earlier onset and widening disparities. Data show sharp increases in incidence among U.S. youth, especially in Black and Hispanic populations, with projections indicating this trend will continue to rise in the coming decades.[6,7] Early-onset T2D has risen substantially over the past three decades, with increasing prevalence – not aging alone – driving the trend and contributing to long-term complications.[5,8]

Among U.S. adults, total diabetes prevalence is substantially higher among Black (20.7%) and Hispanic individuals (17.1%) than among non-Hispanic White individuals (11.2%). Because approximately 90% to 95% of diabetes cases are type 2 diabetes, these findings reflect significant racial and ethnic disparities in the burden of T2D.[9]

A Growing and Shifting Burden

The economic burden is substantial, as earlier diagnosis and reliance on lifelong drug therapies are increasing healthcare spending and system strain. Diabetes cost an estimated $412.9 billion in the U.S. in 2022. [10] Recent real-world studies utilizing low-carbohydrate and ketogenic therapy programs have reported annual savings ranging from $929 to $1,700 per patient, driven largely by lower medication use and reduced overall healthcare utilization, including fewer hospital and doctor visits.[11,12] These trends highlight a growing mismatch between disease burden and current management approaches – pointing to the need for strategies that address underlying drivers, not just downstream effects.

Moving Beyond a Glucose-Centric Model

Currently, the standard of care remains largely focused on glycemic control rather than targeting the metabolic dysfunction causing glycemic dysregulation in T2D. Central to that dysfunction is insulin resistance, a metabolic state in which the body's cells become less responsive to insulin and require higher levels of the hormone to maintain normal blood glucose levels. This glycemic-focused approach can increase treatment burden while leaving insulin resistance – and disease progression – largely intact.[3,4] Evidence consistently shows that metabolic improvement is closely tied to weight loss, particularly reductions in visceral and liver fat, which are associated with reduced insulin resistance.[2,13-18] Carbohydrate-reduced nutrition directly targets these pathways by lowering blood glucose exposure and insulin demand, aligning treatment with disease biology.[13,19] Consistent with this, low-carbohydrate and ketogenic therapeutic approaches have been associated with durable metabolic improvements and, in some cases, drug-free remission.[19,20]

A Consistent Signal in the Evidence

A robust and growing evidence base supports the role of low-carbohydrate and ketogenic therapies in the management – and, in some cases, remission – of T2D. Scientific studies consistently demonstrate that low-carb and ketogenic therapies are associated with greater reductions in body weight and glycated hemoglobin (HbA1c), a measure of average blood glucose over approximately three months, compared to higher-carbohydrate or low-fat diets, particularly in the first 6–12 months.[15,19] Importantly, these metabolic benefits are often accompanied by major reductions in diabetes medications.[2,13,19,21]

A Consistent Signal in the Evidence

Longer-term studies of more than two years have shown that sustained carbohydrate reduction can lead to meaningful rates of drug-free remission – particularly when initiated early in the disease course and accompanied by significant weight loss.[2,19,20,22] In one 8-year general practice evaluation, 77% of patients with T2D for less than one year achieved drug-free remission with a low-carbohydrate therapy, while 20% with longer-standing disease experienced remission.[20]

Comparative studies with pharmaceutical benchmarks, such as GLP-1 receptor agonists, indicate that while these agents can produce similar improvements in glycemic control and weight, their benefits are associated with high costs and side effects, and may not be sustainable or accessible for all patients.[10,23] In contrast, low-carbohydrate and ketogenic interventions are safe and can offer a scalable approach with high rates of engagement and acceptability among patients in real-world care delivery models, including primary care, telehealth, and digital health platforms, demonstrating that these dietary approaches can improve glycemic control, reduce medication burden, and support sustained weight loss over time.[10,20-23] Improvements are not limited to glycemia. Favorable changes in triglycerides, blood pressure, inflammation, and liver function are commonly observed alongside glycemic and weight benefits, indicating broader cardiometabolic benefits.[2,13,15,20-22,24]

Multiple meta-analyses of randomized controlled trials in patients with T2D have also found no significant differences in LDL cholesterol between low-carbohydrate and comparison diets.[25,26]

These findings align with the underlying mechanism: addressing carbohydrate-driven metabolic dysregulation produces system-wide effects beyond glucose alone.

Real-World Implications for Care

Taken together, these findings highlight the importance of earlier diagnosis and dietary intervention, as outcomes – including remission – are more achievable when metabolic dysfunction is addressed early in the disease course.

In practice, this shifts the focus from lifelong disease management to the possibility of altering disease trajectory for some patients. Realizing this potential, however, depends on more than efficacy alone. Questions remain around long-term sustainability, patient support strategies, and how best to implement carbohydrate-reduced approaches across diverse populations and care settings.[13,15,21-23] These are less limitations of the evidence than priorities for its next phase – particularly in the context of delivering patient-centered care at scale. Overall, the current evidence consistently points toward a tailored therapeutic diet that targets underlying metabolic drivers. In this context, low-carbohydrate and ketogenic therapies represent a practical and biologically grounded approach to improving T2D outcomes, supported by a growing body of scientific evidence and real-world clinical experience.

References

1. Centers for Disease Control and Prevention. About type 2 diabetes. Published March 15, 2024. Accessed May 25, 2026. https://www.cdc.gov/diabetes/about/about-type-2-diabetes.html
2. Das R, et al. Long-term efficacy and safety of a low-carbohydrate diet in type 2 diabetes remission: a systematic review. *Cureus. 2025 Sep 27;17(9):e93340.*
3. Riddle MC, et al. Consensus report: definition and interpretation of remission in type 2 diabetes. *Diabetes Care. 2021;44(10):2438–2444.*
4. Rodriguez-Gutierrez R, Montori VM. Glycemic control for patients with type 2 diabetes: our evolving faith in the face of evidence. *Circulation: Cardiovascular Quality and Outcomes. 2016;9(5):504–512.*
5. Zhou Y, et al. Rising tide: the growing global burden and inequalities of early-onset type 2 diabetes among youths aged 15–34 years (1990–2021). *Diabetology & Metabolic Syndrome. 2025;17:103.*
6. Tönnies T, et al. Projections of Type 1 and Type 2 Diabetes Burden in the U.S. Population Aged <20 Years Through 2060: The SEARCH for Diabetes in Youth Study. *Diabetes Care. 2023;46(2):313-320.*
7. Wagenknecht L, et al. Trends in incidence of youth-onset type 1 and type 2 diabetes in the USA, 2002–18: results from the population-based SEARCH for Diabetes in Youth study. *The Lancet Diabetes & Endocrinology. 2023; 11, 242-250.*
8. Fang M, et al. Trends in youth-onset type 2 diabetes, 2013-2024. *N Engl J Med. 2026 Apr 9;394(14):1451-1453.*
9. Centers for Disease Control and Prevention. National Diabetes Statistics Report. Mar 2026. Accessed September 3, 2026.
10. Parker ED, et al. Economic costs of diabetes in the U.S. in 2022. *Diabetes Care. 2024;47(1):26–43.*
11. Buchanan L, et al. TOWARD, a metabolic health intervention, demonstrates robust 1-year weight loss and cost-savings through deprescription. *Frontiers in Nutrition. 2025;12:1548609.*
12. Shanmugam PV, et al. Impact of telehealth nutrition therapy on costs and utilization in type 2 diabetes and obesity. *medRxiv. Preprint. 2026.*
13. Athinarayanan SJ, et al. Long-term effects of a novel continuous remote care intervention including nutritional ketosis for the management of type 2 diabetes: a 2-year non-randomized clinical trial. *Frontiers in Endocrinology. 2019;10:348.*
14. Mora-Rodriguez R, et al. Insulin sensitivity improvement with exercise training is mediated by body weight loss in subjects with metabolic syndrome. *Diabetes Metab. 2020;46(3):210-218.*
15. Yan Y, et al. The efficacy of low-carbohydrate diets on glycemic control in type 2 diabetes: a comprehensive overview of meta-analyses of controlled clinical trials. *Diabetol Metab Syndr. 2025 Aug 19;17(1):341.*
16. Luukkonen PK, et al. Effect of a ketogenic diet on hepatic steatosis and hepatic mitochondrial metabolism in nonalcoholic fatty liver disease. *Proc. Natl. Acad. Sci. U.S.A. 2020;117(13):7347-7354.*
17. Qadri S, et al. Distinct effects of ketogenic and non-ketogenic weight-loss diets on hepatic steatosis and mitochondrial metabolism in MASLD. *J Hepatol. 2026;85:26-36.*
18. Petersen MC, et al. Effect of diet macronutrient content on the cardiometabolic response to weight loss: a randomized clinical trial. *Cell Metab. 2026;38:1-12.*
19. Nicholas AP, et al. Restricting carbohydrates and calories in the treatment of type 2 diabetes: a systematic review of the effectiveness of 'low--carbohydrate' interventions with differing energy levels. *J Nutr Sci. 2021;10:e76.*
20. Unwin D, et al. What predicts drug-free type 2 diabetes remission? Insights from an 8-year general practice service evaluation of a lower-carbohydrate diet with weight loss. *BMJ Nutrition, Prevention & Health. 2023;e000544.*
21. Hallberg SJ, et al. Effectiveness and safety of a novel care model for the management of type 2 diabetes at 1 year: an open-label, non-randomized, controlled study. *Diabetes Therapy. 2018 Apr;9(2):583-612.*
22. McKenzie AL, et al. 5-Year effects of a novel continuous remote care model with carbohydrate-restricted nutrition therapy including nutritional ketosis in type 2 diabetes: an extension study. *Diabetes Res Clin Pract. 2024 Nov;217:111898.*
23. McKenzie AL, et al. Impact of glucagon-like peptide-1 agonist deprescription in type 2 diabetes in a real-world setting: a propensity score–matched cohort study. *Diabetes Therapy. 2024;15(4):843-853.*
24. Jayedi A, et al. Dose-dependent effect of carbohydrate restriction for type 2 diabetes management: a systematic review and dose-response meta-analysis of randomized controlled trials. *Am J Clin Nutr. 2022;116(1):40-56.*
25. Tian W, et al. The effects of low-carbohydrate diet on glucose and lipid metabolism in overweight or obese patients with T2DM: a meta-analysis of randomized controlled trials. *Front Nutrition. 2025;11:1516086.*
26. Ichikawa T, et al. Efficacy of long-term low carbohydrate diets for patients with type 2 diabetes: a systematic review and meta-analysis. *J Diabetes Investigation. 2024;15(10):1410-1421.*