

# Remission more achievable with lower-carbohydrate diet early after type 2 diagnosis

In this GP service evaluation study published in *BMJ Nutrition, Prevention & Health*, 77% of people with type 2 diabetes who chose to follow a lower-carbohydrate diet within 12 months of diagnosis achieved remission, reducing to 20% amongst those with a 15-year type 2 diabetes history. Overall, 51% of those following the lower-carbohydrate eating pattern achieved remission, which was 20% of the total practice type 2 diabetes register. Of those following this eating pattern, 97% improved their glycaemic control. Advice on a lower-carbohydrate diet was provided in standard one-to-one consultations, group consultations and during telephone follow-up from 2013 until 2021, and the impacts on weight, HbA<sub>1c</sub>, lipids and blood pressure (BP) were monitored for those who chose to follow this approach. Over an average of 33 months on the diet, mean weight reduced by 10 kg and median HbA<sub>1c</sub> reduced from 63 to 46 mmol/mol. Reductions in LDL cholesterol (mean 0.5 mmol/L), triglycerides (mean 0.9 mmol/L) and systolic BP (mean 12 mmHg) were also achieved. This approach resulted in significant prescribing savings, with average spend on diabetes drugs of £4.94 per patient per year compared to £11.30 per patient per year for local practices.



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In this study, 8-year real-world data from a single UK practice was examined to identify whether substantial weight loss and type 2 diabetes remission could be achieved using a lower-carbohydrate eating plan delivered in the practice setting, without use of total meal replacements (Unwin et al, 2023). The GPs and practice nurses shared the importance of weight loss and offered simple messages about the impact of dietary carbohydrates on blood sugar and insulin levels. People were able to opt in to receive guidance on how to reduce carbohydrate intake, and the result of this decision was recorded.

Of 473 people with type 2 diabetes on the practice register in April 2021, 186 (39%) had chosen to follow the lower-carbohydrate approach, and had been followed for an average of 33 months. In addition to dietary guidance sheets and usual 10-minute diabetes consultations, 90-minute group consultations (face-to-face, then via Zoom from the beginning of the COVID-19 lockdowns) were offered approximately every 6 weeks. These were accessed by patients

and relatives, with around 25 attending each session. The service delivered and resources used evolved from 2013 to 2021 to meet identified challenges, such as risk of relapse and “food addiction”, and many of the resources are shared in the supplementary data with the paper. The only people excluded from being offered the lower-carbohydrate diet option were those with type 2 diabetes and severe mental illness, terminal illness or eating disorders, who were offered individualised management plans.

An international expert consensus defines type 2 diabetes remission as >3 months of HbA<sub>1c</sub> <48 mmol/mol off all glucose-lowering medication (Riddle et al, 2021). Remission has been demonstrated with a variety of approaches, including a low-calorie meal-replacement diet for 12 weeks in the DiRECT study (Lean et al, 2018) and low- or very-low-carbohydrate diets. The authors of this study attribute their success in helping people achieve remission, weight loss and improved glycaemic control to delivery of the guidance by a trusted health provider, their frank

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discussions of the importance of weight loss, consistent long-term management by the whole primary care team and telephone discussions whenever a rise in HbA<sub>1c</sub> was detected. Giving people the choice of making dietary changes or taking lifelong medication encouraged people to renew commitment to dietary efforts.

Those making dietary changes within 12 months of diagnosis were most likely to achieve remission (77%), with rates decreasing thereafter. This suggests there is a small window of opportunity in which remission may be easier to achieve. Delayed diagnosis during the pandemic may make remission less achievable in future cohorts.

Over an average of 33 months, mean weight reduced by around 10 kg and median HbA<sub>1c</sub> reduced from 63 to 46 mmol/mol, with 97% achieving improved glycaemic control, even if remission was not achieved. Substantial diabetes drug prescribing savings of more than £68 000 per year were achieved by the practice, with the average spend on diabetes drugs reduced from £11.30 per patient per year to only £4.94 per patient per year.

The study had limitations. Lack of randomisation means there is a risk that those choosing to participate in the lower-carbohydrate group may also have been more motivated to manage their diabetes. The actual macronutrient intake of those choosing the lower-carbohydrate approach and their adherence to the diet were not monitored, but the significant weight reduction achieved supports significant changes in diet. The absence of a control group means that it is not possible to compare this dietary approach to routine care.

In the supplementary materials, the authors have been generous in sharing their practice protocol, the infographics used to counsel people about the underlying physiology of type 2 diabetes, their lower-carbohydrate diet sheet, their clinicians’ guide to behaviour change, and detailed statistical analyses used to support their outcomes.

The confirmation that remission was easier to achieve in the first year after diagnosis suggests there is urgency in helping people reduce their carbohydrate intake and lose weight after

diagnosis, and that there may be a short “window of opportunity” after which weight loss and remission may be significantly more difficult to achieve. Perhaps by sharing this message, as well as stating more clearly the importance of weight loss, we may help more people achieve weight loss, remission and improved control. If we don’t already, I hope that we will be inspired to include remission discussions in our early consultations for people recently diagnosed with type 2 diabetes and to continue to share the benefits of reducing carbohydrate intake in follow-up reviews in everyone else, particularly those not yet achieving their agreed glycaemic target and those keen not to take additional drug therapies.

Lean M, Leslie W, Barnes C et al (2018) Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial. *Lancet* **391**: 541–51

Riddle MC, Cefalu WT, Evans PH et al (2021) Consensus report: Definition and interpretation of remission in type 2 diabetes. *Diabetes Care* **44**: 2438–44

Unwin D, Delon C, Unwin J et al (2023) 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 Nutr Prev Health* 2 Jan [Epub ahead of print]

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## 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

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**ABSTRACT**  
**Background** Type 2 diabetes (T2D) is often regarded as a progressive, lifelong disease requiring an increasing number of drugs. Sustained remission of T2D is now well established, but is not yet routinely practiced. Norwood surgery has used a low-carbohydrate programme aiming to achieve remission since 2013.  
**Methods** Adoption of a lower carbohydrate diet and weight loss was offered routinely to people with T2D between 2013 and 2021, in a suburban practice with 9800 patients. Conventional ‘one-to-one’ GP consultations were used, supplemented by group consultations and personal phone calls as necessary. Those interested in participating were computer coded for ongoing audit to compare ‘baseline’ with ‘latest follow-up’ for relevant parameters.  
**Results** The cohort who chose the low-carbohydrate approach (n=160) equated 50% of the practice T2D register. After an average of 33 months median (IQR) weight fell from 97 (84–109) to 86 (76–99) kg, giving a mean (SD) weight loss of –10 (8.9) kg. Median (IQR) HbA<sub>1c</sub> fell from 63 (54–80) to 46 (42–53) mmol/mol. Remission of diabetes was achieved in 77% with T2D duration less than 1 year, falling to 20% for duration greater than 15 years. Overall, remission was achieved in 51% of the cohort. Mean LDL cholesterol decreased by 0.5 mmol/L, mean triglyceride by 0.5 mmol/L, and mean systolic blood pressure by 12 mm Hg. There were major prescribing savings: average Norwood surgery spent was £4.94 per patient per year on drugs for diabetes compared with £11.30 for local practices. In the year ending January 2022, Norwood surgery spent £68 353 per year less than the area average.  
**Conclusions** A practical primary care-based method to achieve remission of T2D is described. A low-carbohydrate diet-based approach was able to achieve major weight loss with substantial health and financial benefit. It resulted in 20% of the entire practice T2D population achieving remission. It appears that T2D duration <1 year represents an important window of opportunity for achieving drug-free remission of diabetes. The approach can also give hope to those with poorly controlled T2D who may not achieve remission, this group had the greatest improvements in diabetic control as represented by HbA<sub>1c</sub>.

**WHAT IS ALREADY KNOWN ON THIS TOPIC**  
 ⇒ The idea of drug-free remission of type 2 diabetes (T2D) gives hope to many and can be achieved in different ways.  
 ⇒ Surgery and starch-free foods worsen blood glucose control so a low-carbohydrate diet is a logical first step.

**WHAT THIS STUDY ADDS**  
 ⇒ Advice and ongoing guidance on a low-carbohydrate diet in primary care can achieve improved diabetic control for 97% of those interested in the approach, sustained for an average of 33 months.  
 ⇒ Those patients who started with ‘younger’ diabetes and lower HbA<sub>1c</sub> were far more likely to achieve remission.  
 ⇒ Those in the non-remission, ‘mitigation’ group achieved unexpectedly greater, clinically important improvements in diabetic control with the diet.

**HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY**  
 ⇒ Seventy-seven per cent of those adopting a low-carbohydrate approach in the first year of their T2D achieved remission. This represents an important ‘window of opportunity’ for further investigation.  
 ⇒ People with established long-term T2D, which may be poorly controlled could benefit from looking carefully at reducing sugar and starch carbohydrates.

**INTRODUCTION**  
 In 2021, the British Diabetic Association published a review of dietary strategies for drug-free remission of type 2 diabetes (T2D),<sup>1</sup> which stated that “total dietary replacements and low-carbohydrate diets have been demonstrated as being effective in facilitating weight loss and remission of T2D”. However, researchers do not always support a focus on low-carbohydrate diets to achieve either weight loss or remission of diabetes.<sup>2</sup> There is a need for hard data on outcomes of such an approach and to examine what clinical aspects help it succeed.

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