Myths and Facts About Low Carb Diets

April 17th 2026

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Research Director, Michigan Medicine Weight Navigation Program
Co-Medical Director, VA Ann Arbor, Medical Weight Management

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by 1:00 PM on April 20th

This activates your online evaluation in the CE portal (new users follow prompts after texting to set up account).

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STEP 2:

Complete the required online evaluation

by May 3, 2026

In the Cloud CME portal at https://corewellhealtheast.cloud-cme.com [Sign In > select **My CME** > select **Evaluations & Certificates**] – or – via the free CloudCME mobile app (organization code *COREWELLHEALTHEAST)*

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MCT2D Learning Community Series 2026
Myths and Facts on Low-Carb Diet

CME/CE credit is available

In support of improving patient care, this activity has been planned and implemented by Corewell Health Southeast Michigan and Michigan Collaborative for Type 2 Diabetes. Corewell Health Southeast Michigan is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

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Dietetic CPEU:

Commission on Dietetic Registration
eat right. Academy of Nutrition and Dietetics

Completion of this RD/DTR profession-specific or IPCE activity awards CPEUs (One IPCE credit = One CPEU).

If the activity is dietetics-related but not targeted to RDs or DTRs, CPEUs may be claimed which are commensurate with participation in contact hours (One 60 minute hour = 1 CPEU).

RD's and DTRs are to select activity type 102 in their Activity Log. Sphere and Competency selection is at the learner's discretion.

Disclosure of Financial Relationships:

The following speakers and/or planning committee members have identified the following relevant financial relationship(s) with ineligible companies.

All other individuals involved with this activity have no relevant financial relationships with ineligible companies to disclose.

- **Lauren Oshman, M.D. (Course Co-Director):** Stocks in publicly traded companies or stock options, excluding diversified mutual funds-Abbott, AbbVie, Johnson & Johnson, Merck & Co., Organon.

Objective

1. To address common myths and concerns about the efficacy, safety, and long-term sustainability of low- and very low-carbohydrate diets.


Introduction

How Are Low Carbohydrate Diets Defined?

	% total energy from carb*			
Diet type	≤10%	>10% to 26%	>26% to 45%	>45%
Very low carbohydrate	20-50 grams			
Low carbohydrate		50-130 grams		
Moderate carbohydrate			130-225 grams	
High carbohydrate				>225 grams

*Based on 2000 kcal/day diet

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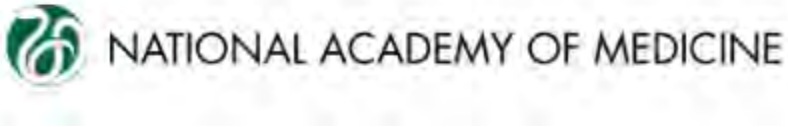
Is there a *Minimum Requirement* for Carbohydrates?

- Essential need for certain amino acids and fatty acids are well established in the literature.
- There is debate over whether an essential level of dietary carbohydrates exists for human health.
    - **Gluconeogenesis** and **glycogenolysis** are processes in which humans can obtain necessary glucose for the functioning of brain and red blood cells

“The lower limit of dietary carbohydrate compatible with life is apparently zero, provided that adequate amounts of protein and fat are consumed. However, the amount of dietary carbohydrate that provides for optimal health in humans in unknown.” ***- Institute of Medicine of the National Academies 2005***



Myth #1

Low Carb Diets Always Have Side Effects

Potential Side Effects

Minor Side Effects	Major Side Effects
• “Keto Flu” • Halitosis • Constipation • Muscle cramping	• Hypoglycemia • Hypotension

Mitigation Strategies for Minor Side Effects

- **“Keto flu”: fatigue, lightheadedness, headache, diarrhea**
  - Gradual reduction in CHO, 1 meal at a time
  - Generally resolves within 7-10 days
  - Treat with adequate fluid intake (2-3 L/day)
  - Adequate sodium intake (2-3 g Na/day or 2 cups broth)

- **Halitosis “keto breath”**
  - Increase water intake
  - Maintain good oral hygiene
  - Sugarless mints/gum

Mitigation Strategies for Minor Side Effects

- **Constipation**
  - Gradual increase of dietary fiber
  - Maintain fiber-rich diet
  - Adequate fluid hydration
  - Consider stool softeners, laxatives, fiber supplements

- **Muscle cramping**
  - Consider magnesium supplement

Potential Side Effects

Minor Side Effects	Major Side Effects
• "Keto Flu" • Halitosis • Constipation • Muscle cramping	• Hypoglycemia - Patients with type 1 diabetes - Patients on insulin, SUs, SGLT2i, TZD • Hypotension - Patients on anti-hypertensive meds

Managing Anti-Hyperglycemic Medications

Sulfonylureas
Meglitinides
Bolus mealtime insulin (for most)
Combination insulins (70/30); switch to basal insulin
SGLT2 inhibitors*

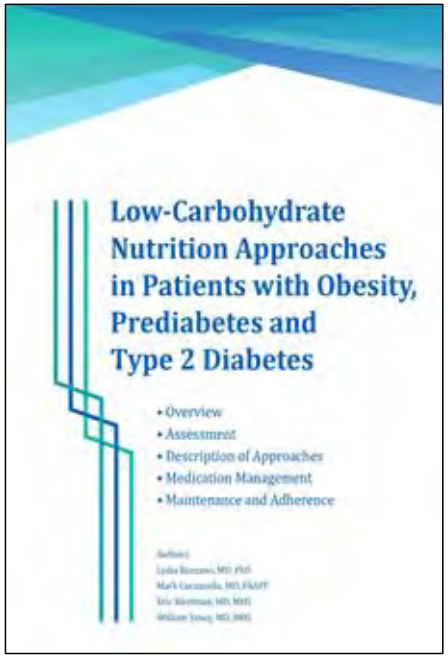
Basal insulin
Thiazolidinediones

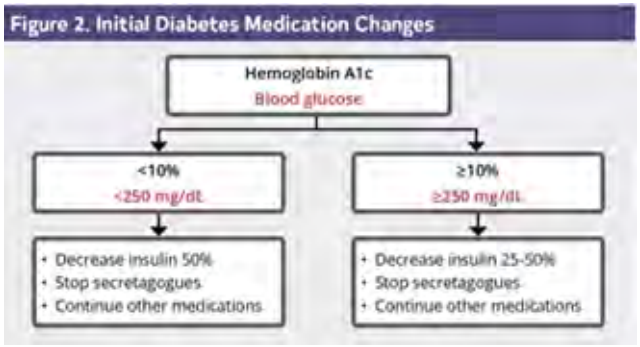
Biguanides
Incretin mimetics
DPP 4 inhibitors

*Stop if <50 grams of carbs to avoid rare risk of euDKA

Cucuzzella et al., *Frontiers in Nutrition*. 2018
https://doi.org/10.3389/fnut.2021.688540

Adjust T2D Medications to Avoid Hypoglycemia





Give patients guidance on self-adjusting medications and permission to allow slightly elevated blood sugar levels while learning to reduce carbs

MCT2D

Low-Carbohydrate Nutrition Approaches in Patients with Obesity, Prediabetes and Type 2 Diabetes - Low Carb Nutritional Approaches - Guidelines Advisory (guidelinecentral.com)

Adjust BP Medications to Avoid Hypotension

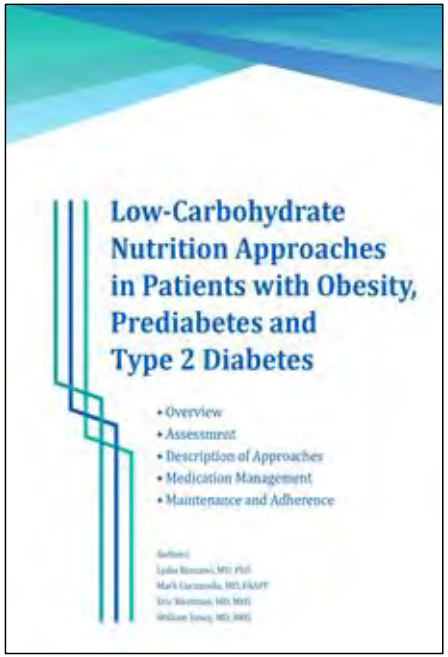


Table 3. Blood Pressure Medication Adjustment

Blood pressure, mm Hg		Change in one medication
Systolic	Diastolic	
<110	NA	Decrease by 25–50%
110–149	<95	No change
150–169	95–110	Increase by 25–50%

Encourage patients to self-monitor BP.
Give permission to HOLD BP meds if s/s of hypotension.
Encourage excellent hydration.

Low-Carbohydrate Nutrition Approaches in Patients with Obesity, Prediabetes and Type 2 Diabetes - Low Carb Nutritional Approaches - Guidelines Advisory (guidelinecentral.com)

T2D Medications: Considerations for Decision Making

Three key clinical considerations:

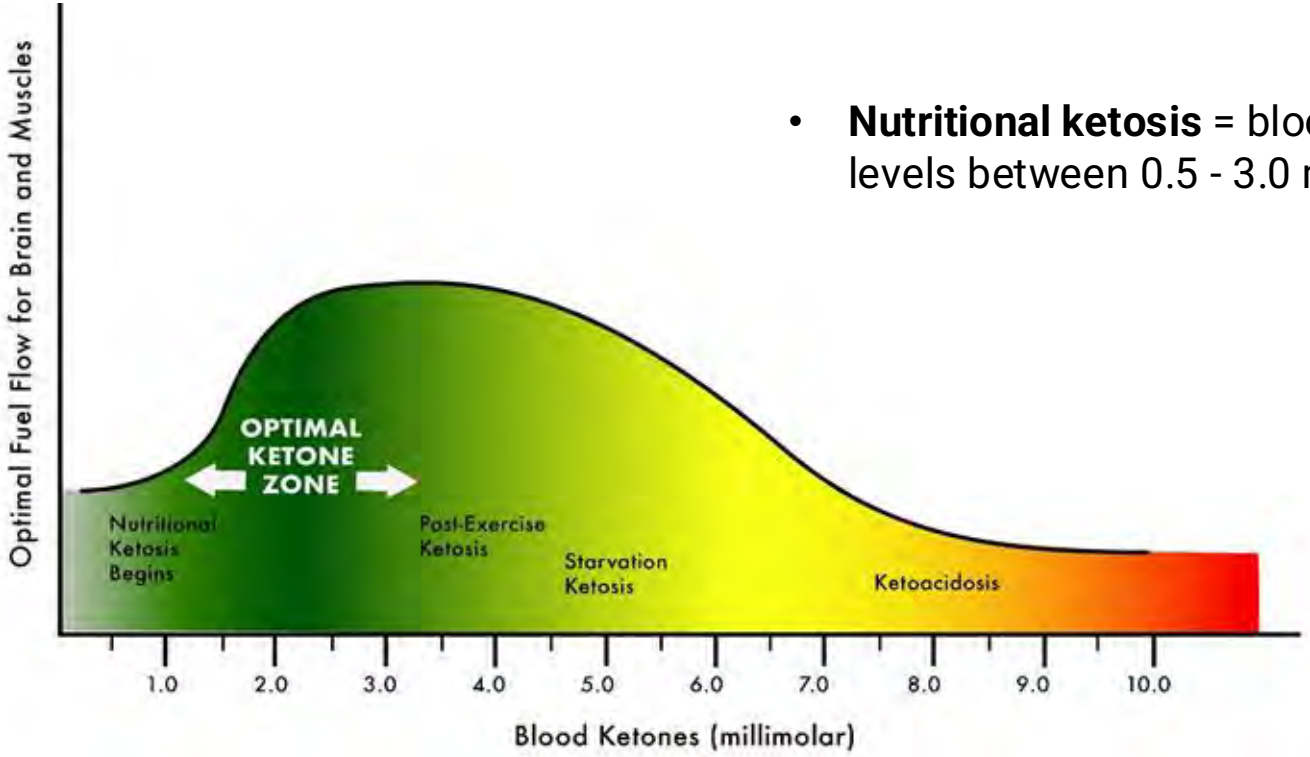
1. Is there a risk of hypoglycemia/hypotension?
2. What is the degree of carbohydrate restriction?
3. Does the medication provide any benefit? If so, do the benefits outweigh any side effects and potential risks?

Cucuzzella et al., *Frontiers in Nutrition*. 2018

Myth #2

Low Carb Diets Cause Ketoacidosis

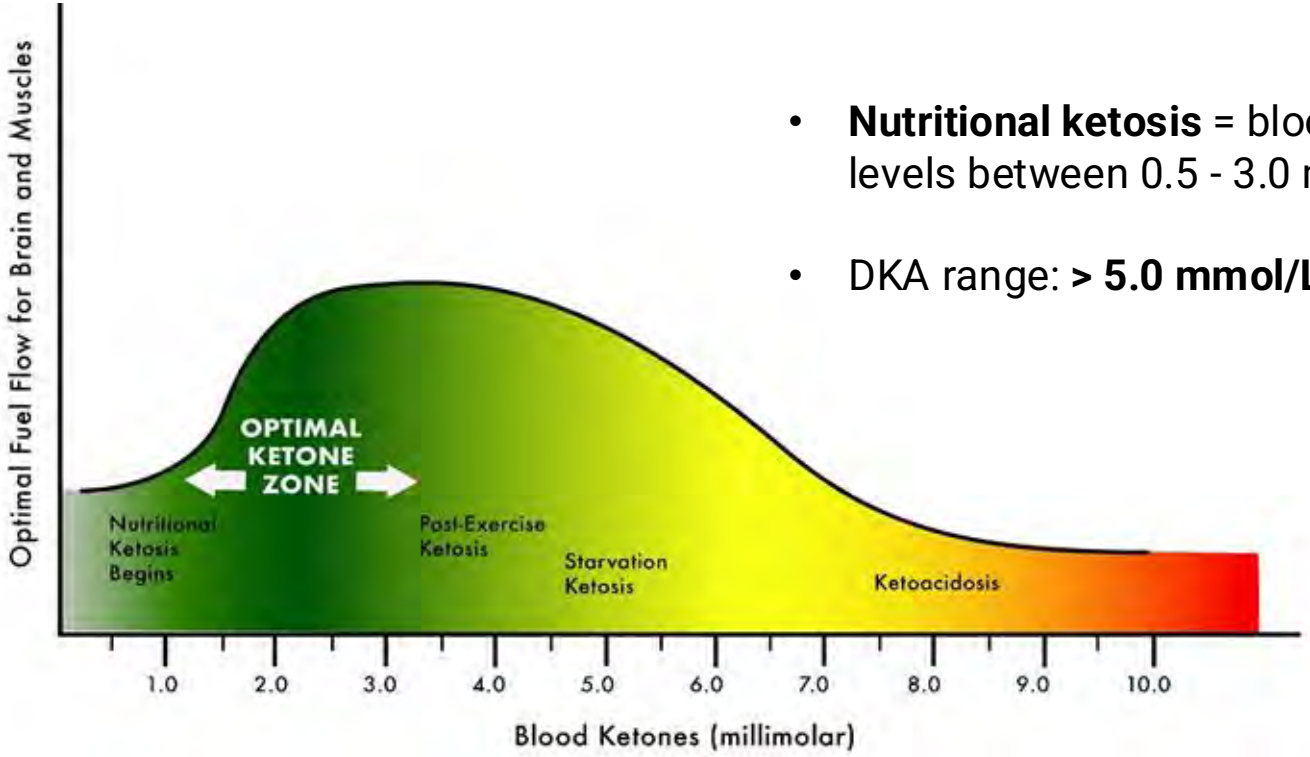
Very Low-Carb Diets Can Induce Nutritional Ketosis



- **Nutritional ketosis** = blood ketone levels between 0.5 - 3.0 mmol/L

Adapted from Volek and Phinney; The Art and Science of Low Carbohydrate Living; pg 91

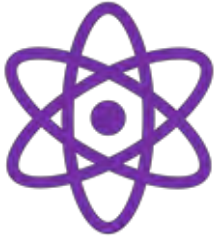
Very Low-Carb Diets Can Induce Nutritional Ketosis



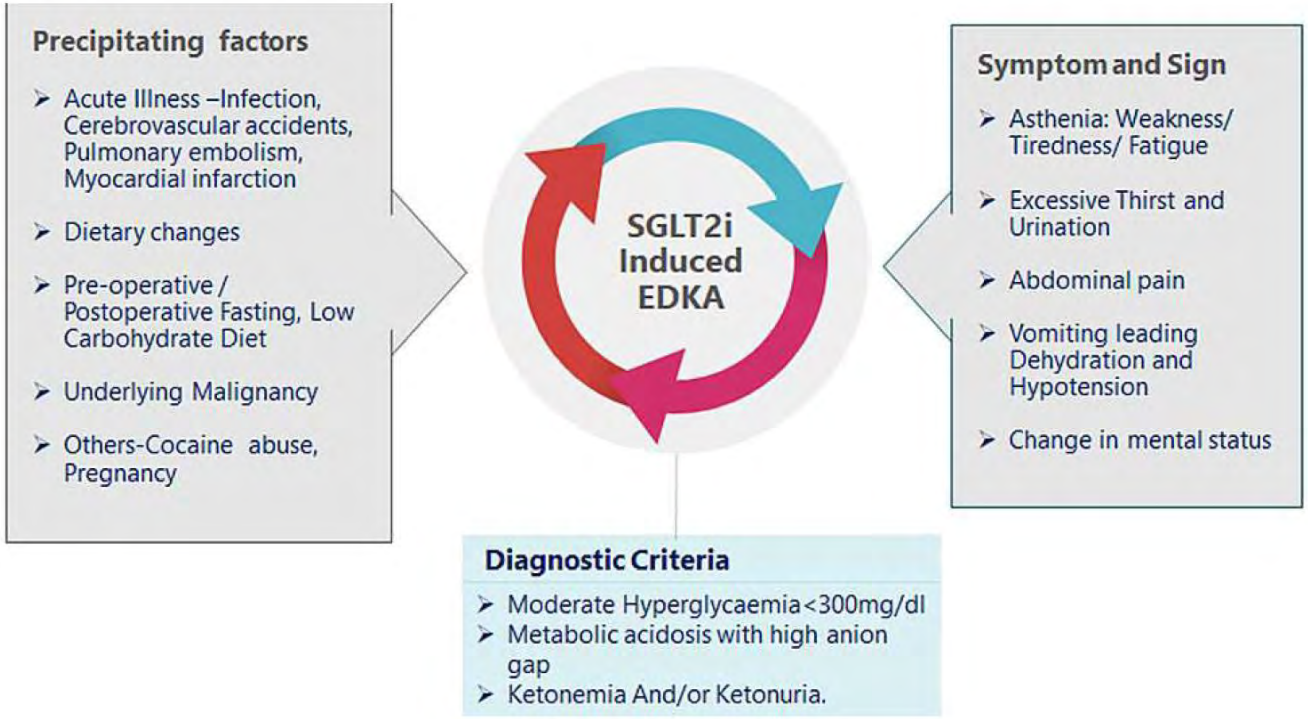
- **Nutritional ketosis** = blood ketone levels between 0.5 - 3.0 mmol/L
- DKA range: **> 5.0 mmol/L**

Adapted from Volek and Phinney; The Art and Science of Low Carbohydrate Living; pg 91

Potential Benefits of Nutritional Ketosis

Reduced Body Weight 	**Reduced Blood Sugar** 	**Improved Body Composition** 
Improved Measures of Cardiovascular Health 	**Improved Cognitive Function** 	**Improved Mitochondrial Health** 

Rare Risk of Euglycemic Diabetic Ketoacidosis (euDKA)



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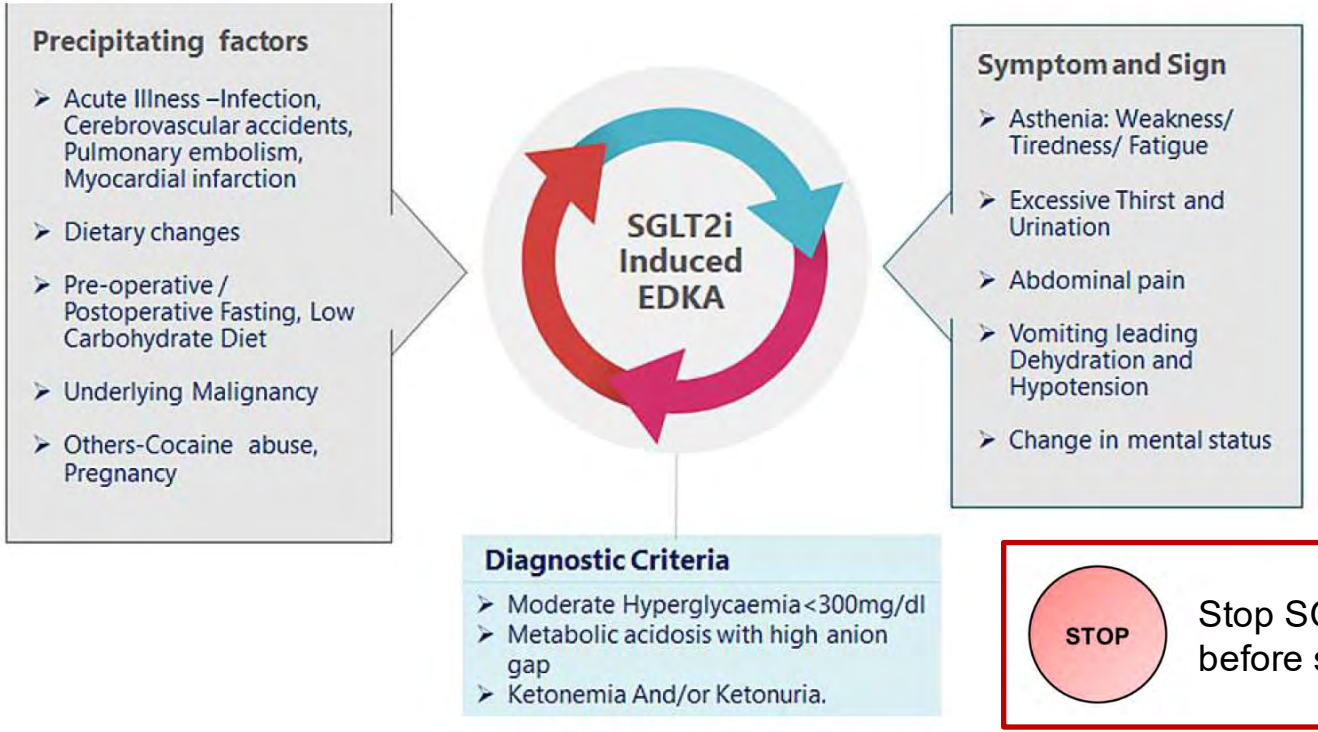
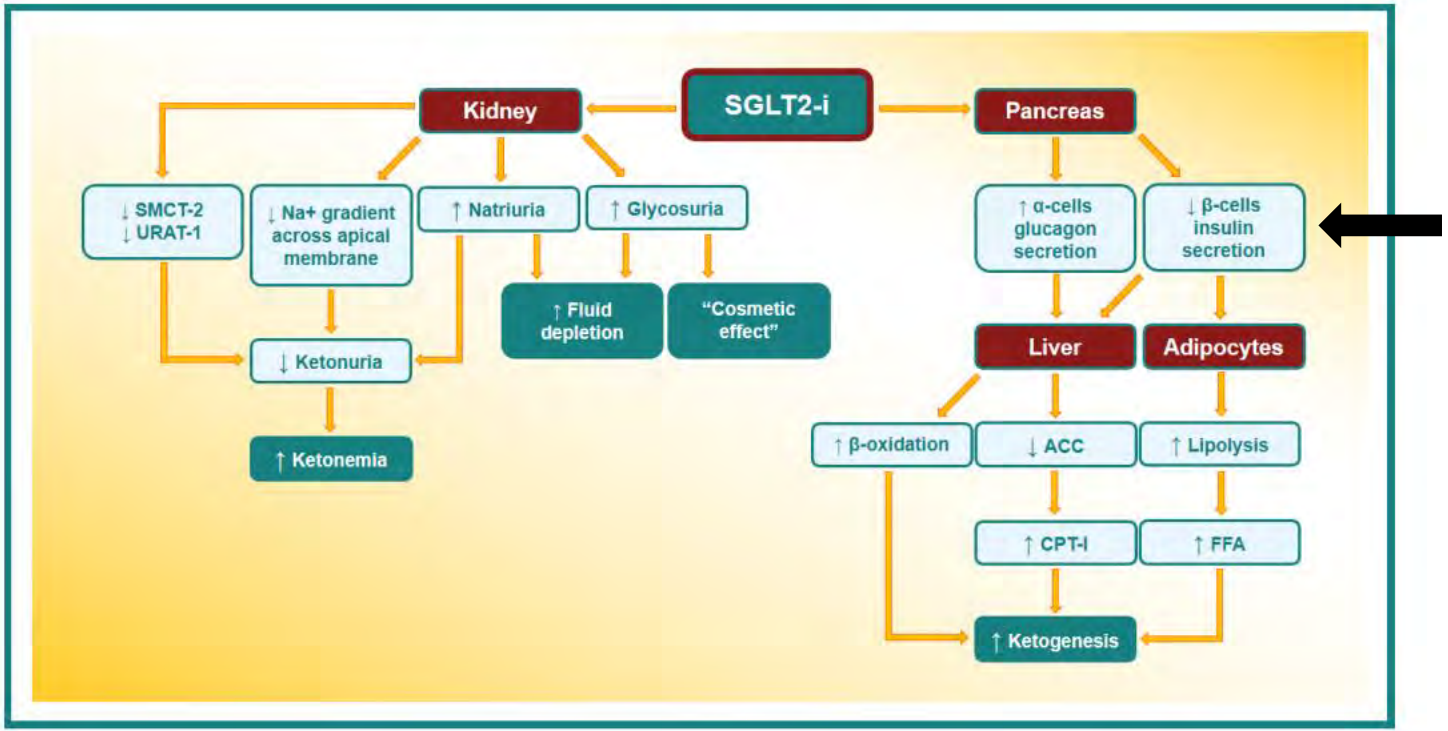


STOP

Stop SGLT inhibitors before starting a VLCD

Risk is Related to Shared Mechanism of Action

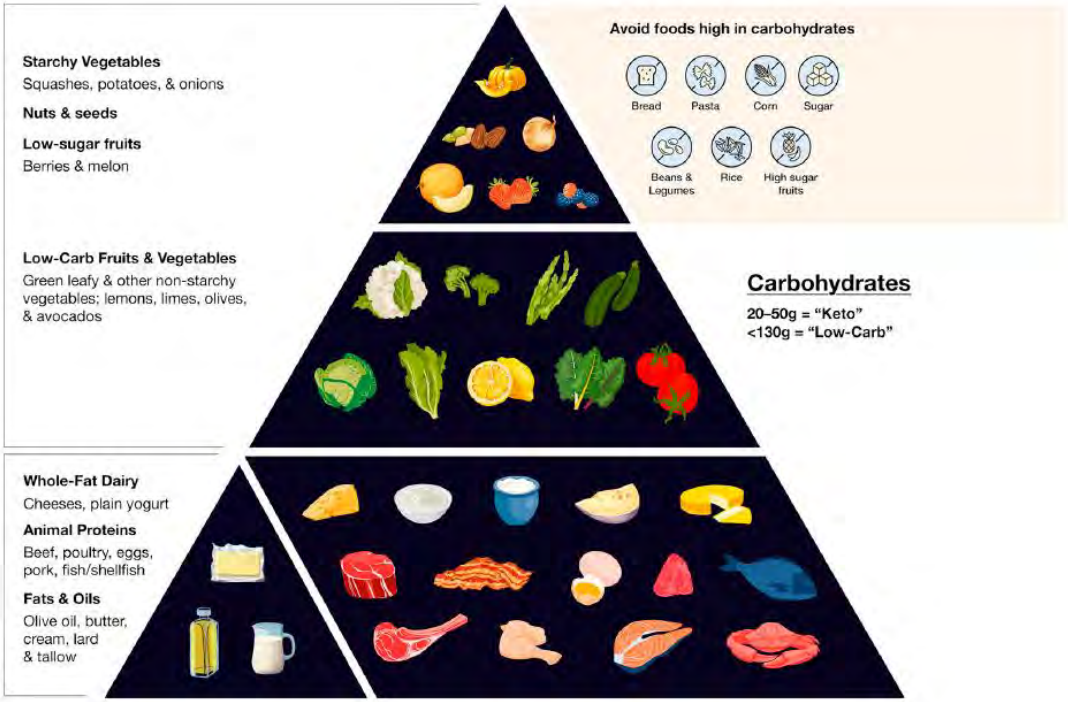


Morace et al., *Metabolites*. 2024

Myth #3

Low Carb Diets Are Not Heart Healthy

Concerns about High Saturated Fat Intake



- Low-carb diets may be higher in saturated fat
- In the context of a low-carb diet, dietary saturated fat does not increase levels of saturated fat in the blood (plasma)

Saturated Fats and Cardiovascular Health

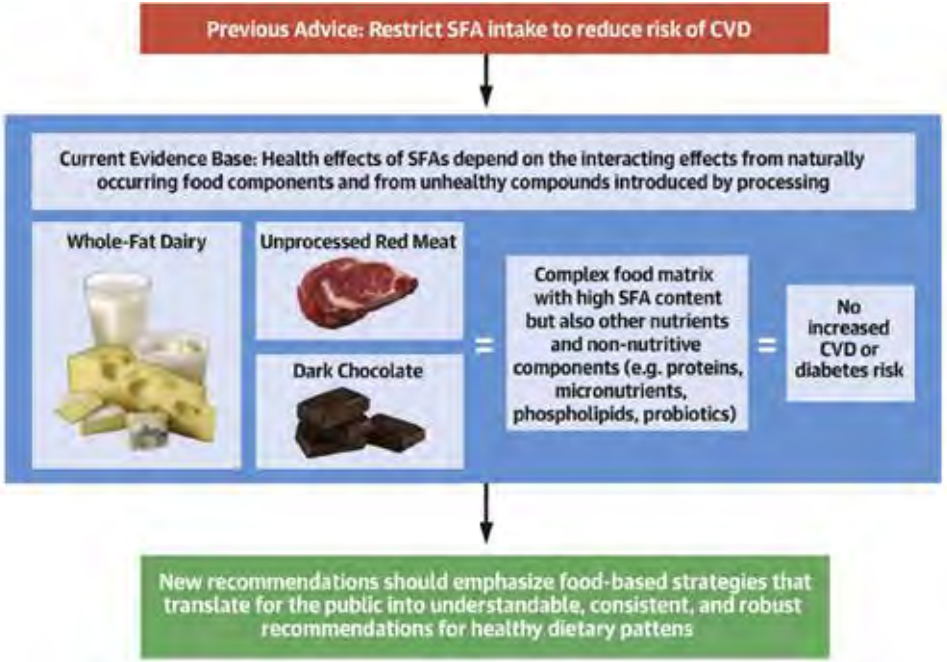


TABLE 1 Major Naturally Occurring Saturated Fatty Acids

Abbreviation	Common or Systematic Name	Carbon Chain Length	Major Dietary Sources
4:0	Butyric	Short	Dairy foods
6:0	Caproic	Short	Dairy foods
8:0	Caprylic	Medium	Dairy foods, coconut and palm kernel oils
10:0	Capric	Medium	Dairy foods
12:0	Lauric	Medium	Coconut milk and oil
14:0	Myristic	Long	Dairy foods
15:0	Pentadecanoic	Long	Red meat, dairy foods, oils
16:0	Palmitic	Long	Red meat, dairy foods, palm oil
17:0	Heptadecanoic	Long	Red meat, dairy foods
18:0	Stearic	Long	Dairy foods, meat, chocolate

C15:0 and C17:0 are predominantly obtained from food sources, whereas circulating levels of all other saturated fatty acids are influenced by both dietary intake and endogenous metabolism.

Astrup et al, *JACC State of the Art Review*, 2020.

Dietary Fats and Cardiovascular Disease

A Presidential Advisory From the American Heart Association

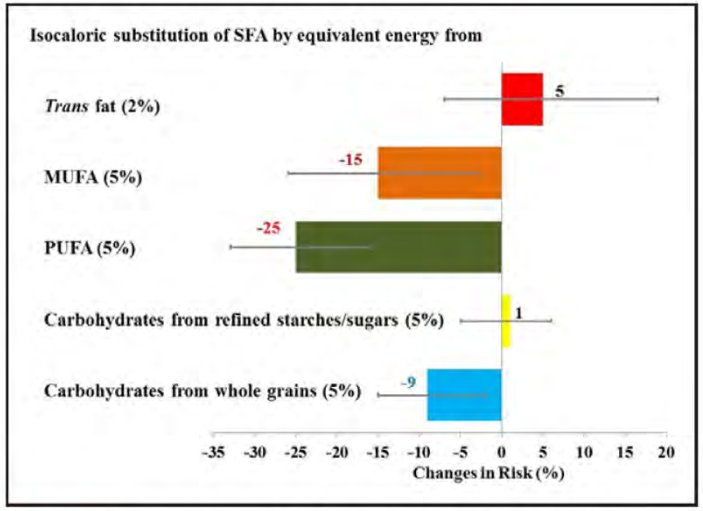


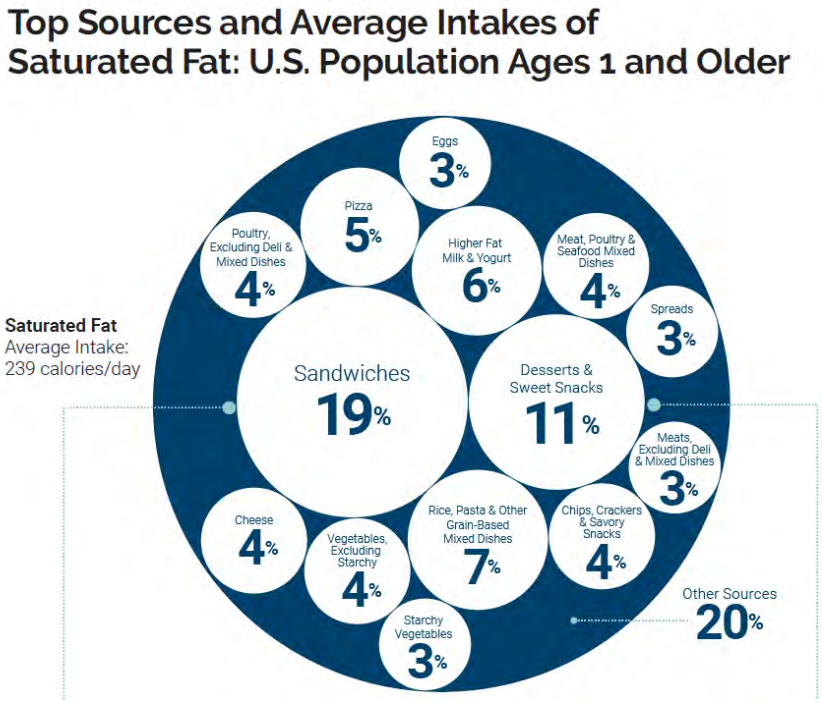
Figure 3. Replacement of saturated fat with other types of fat or carbohydrates.

SUMMARY OF CONCLUSIONS

Dietary saturated fat, like any macronutrient, supplies energy (calories) to the diet. In randomized clinical trials on saturated fat, the group that is assigned a diet lower in saturated fat is taught how to replace it with foods higher in ≥1 other macronutrients, typically carbohydrates or unsaturated fats, to maintain the same total energy intake. Other trials, often called controlled feeding trials, actually provide to the research participants their assigned diet high or low in saturated fat balanced with a similar amount of energy from another macronutrient. Essential to the interpretation of the results from these trials (and the reason for the divergent results in meta-analyses noted above) is the macronutrient composition of the comparator diet. Clinical trials that used polyunsaturated fat to replace saturated fat reduced the incidence of CVD.[9,10] In contrast, trials that used mainly carbohydrates to replace saturated fat did not reduce CVD. However, the types of carbohydrate-containing foods were often unspecified and typically included sugar and other refined carbohydrates to maintain energy balance. Evidence from prospective observational studies indicates that carbohydrates from whole grains reduce CVD when they replace saturated fat.[18]

Sacks et al, Circulation, 2017.

Top Sources of Saturated Fat in US Diet



"Significantly limiting highly processed foods will help meet [saturated fat] goals."

2025–2030 Dietary Guidelines for Americans

Low Carb Diets Can Improve Measures of CV Health

- 2020 BMJ systematic review and network meta-analysis of **121 randomized trials (21,942 patients)** compared **14 popular diets** across key cardiometabolic measures.

- At 6 months, low carb diets produced:
  - Weight loss of ~4.6 kg vs. usual diet
  - SBP reduction of ~5.1 mmHg
  - HDL cholesterol increase: +2.3 mg/dL
  - LDL cholesterol decrease: ~1.0 mg/dL, not statistically significant
    - Less effective than low-fat, Mediterranean/DASH-style diets

Ge L et al., BMJ. 2020

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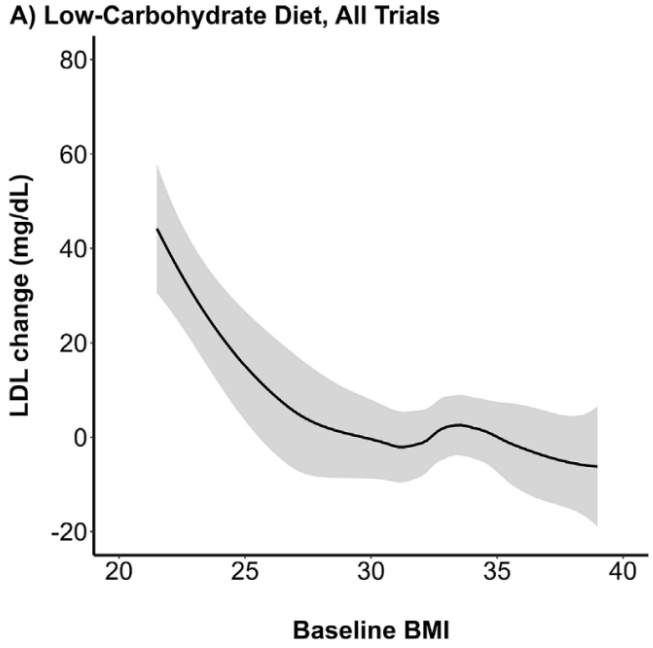
Weight loss diminished at 12 months among all diets and all CV benefits essentially disappeared (except for sustained LDL reductions in Mediterranean-style diet)

Ge L et al., BMJ. 2020

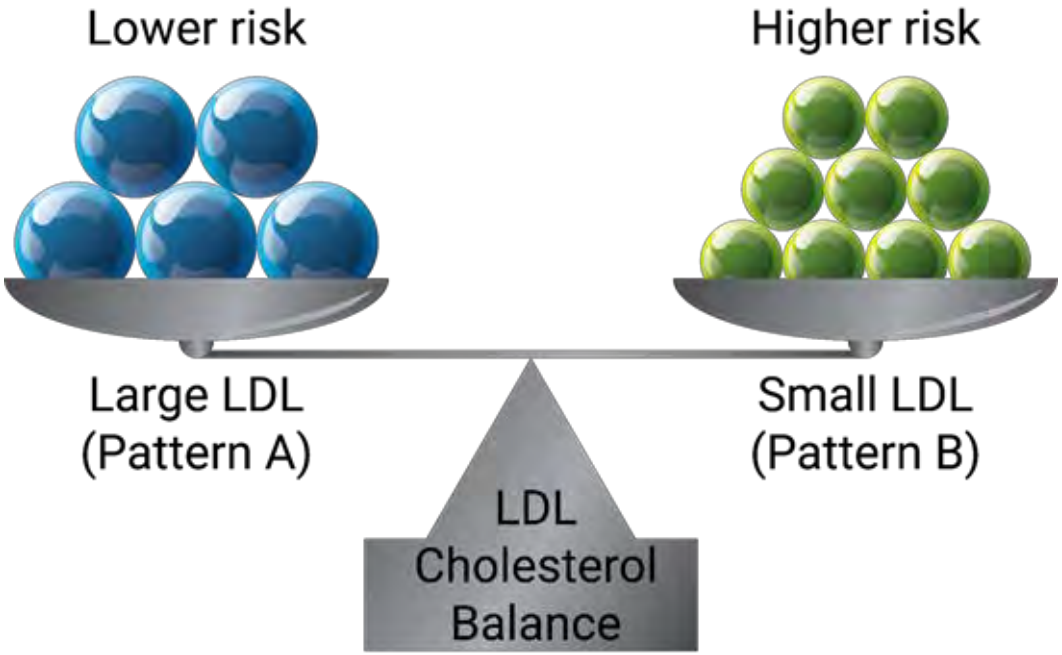
LDL Elevations Can Occur with Low Carb Diets

- LDL increases generally range from 3-15 mg/dL
- Often associated with overall reductions in ASCVD risk due to improvements in other CV risk parameters
- More profound increases may occur in individuals with lower baseline BMI



Wang et al. The American Journal of Clinical Nutrition, 2024
Chawla et al. *Nutrients*, 2020
Nordmann, et al. *Arch Intern Med,* 2006
Dong et al. *PLOS ONE*, 2019
Sota-Mota et al. *American Journal of Clinical Nutrition,* 2024

Standard LDL Measures May Not Tell The Full Story



Daoud et al. *J. Cardiovasc. Dev. Dis.*, 2014

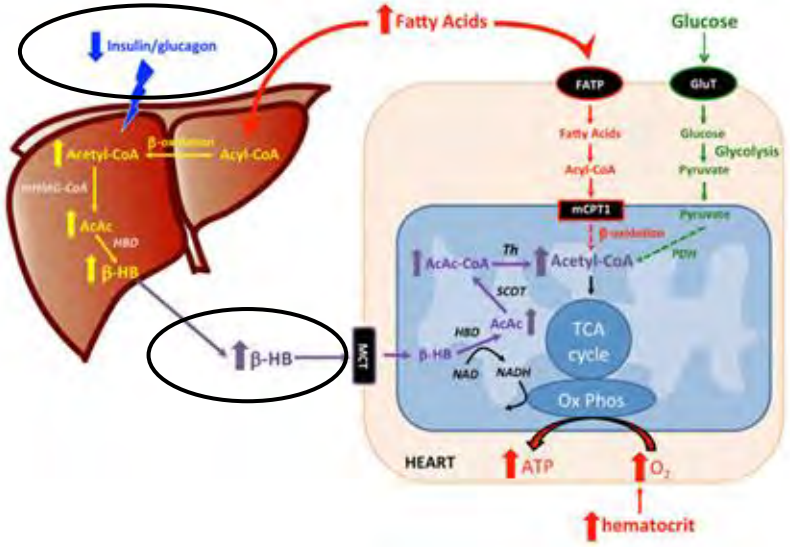
Similar Lipid Changes With SGLT2 Inhibitors

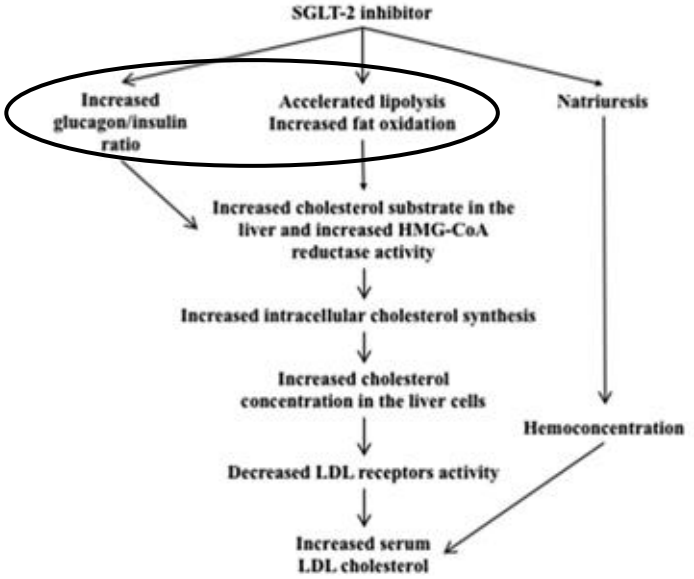
Table 3. Changes of serum lipid metabolism parameters following SGLT-2 inhibitors administration.

Total cholesterol	Increased or no change
Triglycerides	Decreased or no change
HDL-C	Increased (by 5–10%)
LDL-C	Increased (by 5–10%)
Large buoyant LDL-C	Increased or no change
Small dense LDL-C	Decreased (by 20–30%)
Apolipoprotein-A1	Increased
Apolipoprotein-B	Increased or no change
HDL2-C	Increased
Cholesterol efflux capacity	No change

Filippas-Ntekouan et al. *Expert Opinion on Drug Metabolism & Toxicology*, 2018

SGLT2 Inhibitors Increase LDL via Mild Ketosis





Filippas-Ntekouan et al. *Expert Opin Drug Metab Toxicol.*, 2018
Ferrannini et al. *Diabetes Care.*, 2016

Myth #4

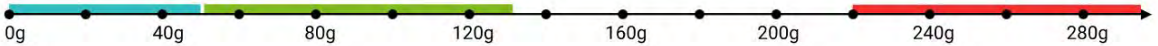
Low Carbohydrate Diets Cause Kidney Damage

Low-Carb Diets are Not High Protein Diets

Very Low Carbohydrate (Ketogenic)
Less than 50 grams of carbs per day

Low Carbohydrate
50-130 grams of carbs per day

Typical American (2,000 calories)
225-325 grams of carbs per day



Meal with ~16g of carbs

4-5 oz	Grilled Fish or Chicken	0g carbs
3 cups	Mixed Salad	5g carbs
1 oz	Feta Cheese and Olives	1g carbs
2 tbsp	Ranch Dressing	2g carbs
1/2	Avocado	8g carbs

Meal with ~47g of carbs

1/2 cup	Brown Rice	22g carbs
1/2 cup	Black Beans	22g carbs
4-5 oz	Steak	0g carbs
1.5 cups	Grilled Vegetables	10g carbs

Meal with ~150g of carbs

s slices	Pepperoni Pizza	70g carbs
4 pcs	Mozzarella Sticks	30g carbs
1/2 cup	Marinara Sauce	10g carbs
12 oz	Regular Soda	40g carbs

Protein is Essential for Health

- Recommended Daily Allowance (RDA) for protein is 0.8g/kg/day
- RDA = minimum intake to be in positive nitrogen balance and prevent muscle breakdown
- Growing body of evidence supports protein intake above 0.8 g/kg/day
    - Not associated with reduction in eGFR in individuals with normal renal function

French et al., *Am J Clin Nutr.*, 2025
Cuenca-Sanchez et al., *Adv Nutr.* 2015

RDA for Protein is The Floor, Not The Ceiling

- Protein intake ranging from **1.2-1.6 g/kg/day** consistently outperform the RDA for functional outcomes.
  - Muscle synthesis
  - Mobility
  - Bone health
  - Overall life span
- Higher protein dietary patterns:
  - Improve satiety and appetite control
  - Preserve lean mass during weight loss
  - Shift weight loss towards fat mass rather than muscle

Humayun et al., *AJCN*, 2007
Tang et al., *AJCN*, 2014
Wallace and Frankenfeld, *J Am Coll Nutr*, 2017
Rafii et al., *J Nutr*, 2016
Tagawa et al., *Nutrition Reviews*, 2020
Nunes et al., *JCSM*, 2022
Guarneiri et al., *Lipids Health Dis*, 2025

Considerations for Advanced Kidney Disease

For individuals with advanced stage CKD, high dietary protein intake can exacerbate intraglomerular hypertension, which may result in:

1. Kidney hyperfiltration
2. Glomerular injury
3. Proteinuria

Do Low Protein Diets Slow Kidney Decline in Diabetic Kidney Disease?

There is a lack of high quality evidence on the benefits of restricting protein to <0.8 g/kg/day to slow progression of kidney disease in patients with DKD.

“Compared with a usual or unrestricted protein diet, a low protein diet may have little or no effect on the number of people who died or progress to kidney failure needing dialysis.” ***- Jiang et al. 2023***

Statements from KDIGO and ADA Guidelines

"An exhaustive literature search failed to show more than weak to very weak evidence that limiting protein intake to less than normal recommendations slowed the progression of kidney failure or decreased mortality." - ***KDIGO 2022***

"In people with CKD and diabetes, consuming protein below the RDA 0.8 g/kg/d is not recommended, because it does not alter blood glucose levels, cardiovascular risk measures, or the course of GFR decline...Higher levels of protein intake (>20% energy intake or >1.3 g/kg/d) should be avoided." ***-ADA Standards of Care 2026***

Myth #5

Low Carbohydrate Diets are Not Sustainable

5-Year Effects of VLCD & Continuous Care Model

Contents lists available at

Diabetes Research and Clinical Practice

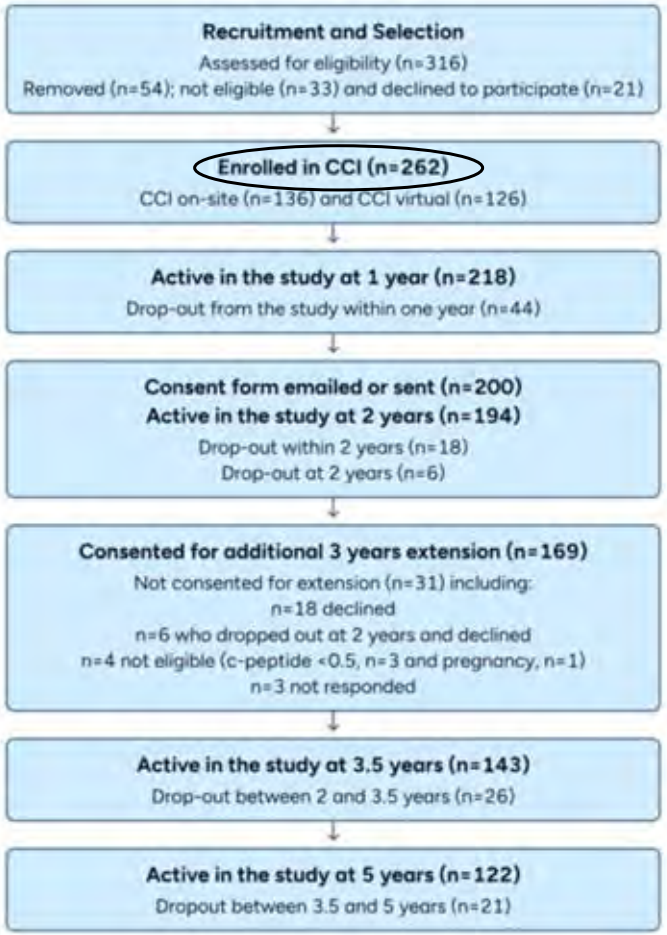
journal homepage:

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

Amy L. McKenzie, Shaminie J. Athinarayanan, Michelle R. Van Tieghem, Brittanie M. Volk, Caroline G.P. Roberts, Rebecca N. Adams, Jeff S. Volek, Stephen D. Phinney, Sarah J. Hallberg

- **Design: 5 year extension of very low carb telehealth program for T2D**
- Inclusion: Adults with T2D, average A1C ~7.6%
- Intervention: app-based **VLCD,** carbs <30g, protein 1.5 g / kg LBW eat fat to satiety. Home BHB (ketone) testing, diet monitoring and **med mgt** via in-person or app and remote care. Industry sponsored trial by Virta Health.

Flowchart of Participants in CCI from Baseline to 5 Years



83% retention rate at 1 year

74% retention rate at 2 years

47% retention rate at 5 years

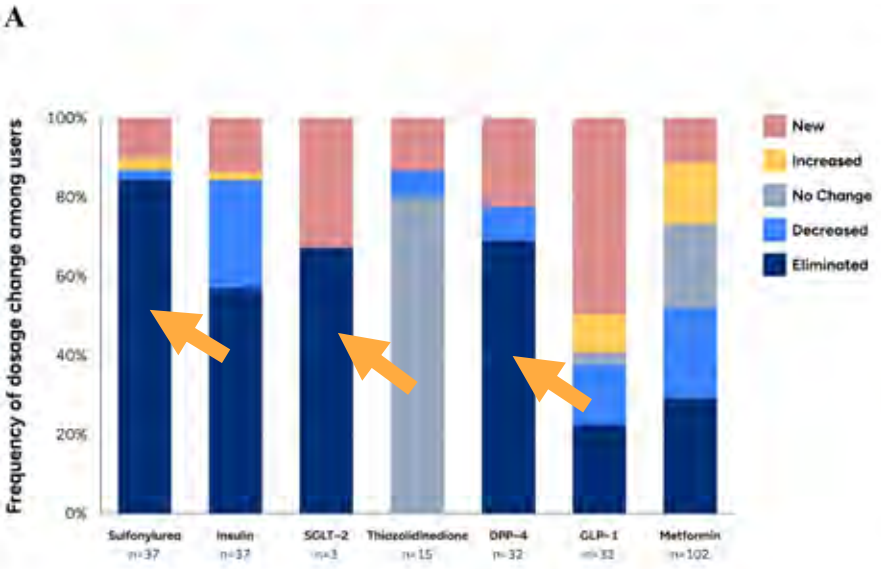
McKenzie et al., *Diabetes Res and Clin Prac.*, 2024

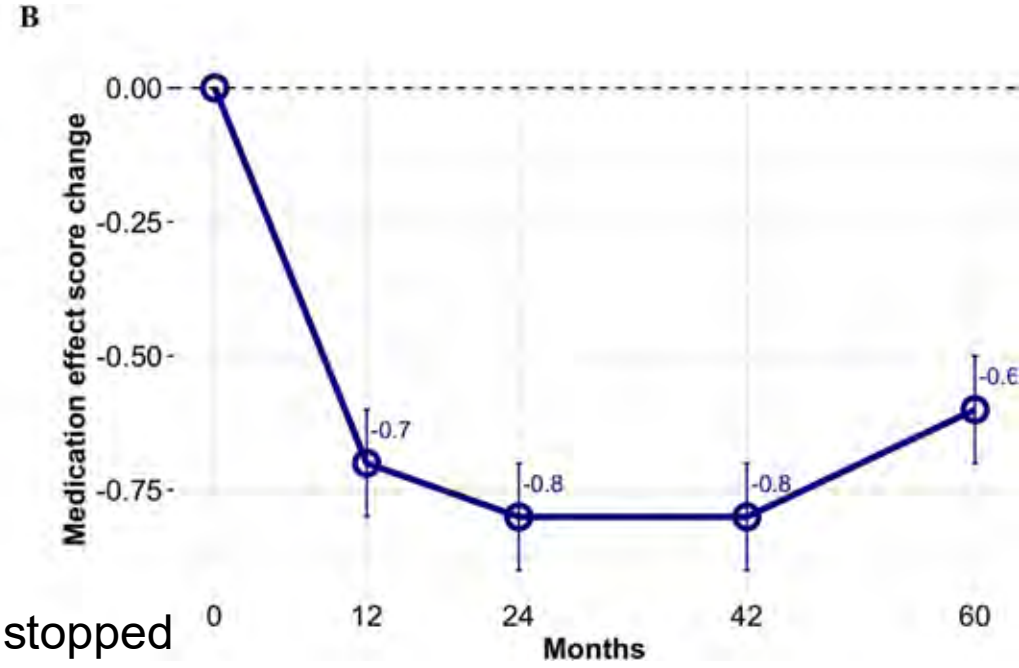
Summary of Results

- **Results:** 46% (120 / 262) were monitored to five years.
  - **20% (n=24) sustained diabetes remission** (A1c<6.5% and not on any glucose-lowering therapy for ≥ 3 months).
  - **32.5% (n=39) diabetes "reversal"** (A1c <6.5%, only on metformin).
  - Improved TG / HDL / inflammatory markers and no change in LDL-C / total cholesterol.

McKenzie et al., *Diabetes Res and Clin Prac.*, 2024

How Does VLCD Affect Medication Burden?

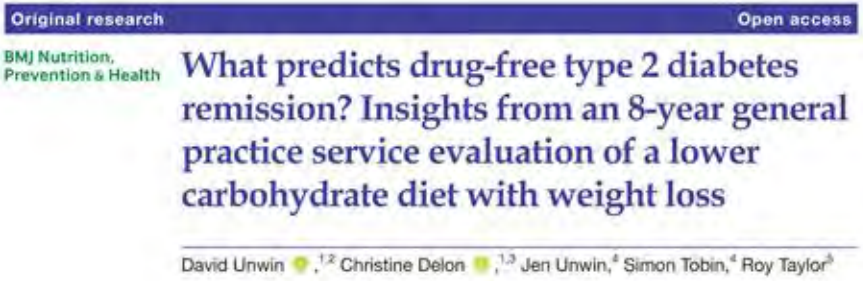




SU's, SGLT2i's, DPP4's most likely to be stopped

McKenzie et al., *Diabetes Res and Clin Prac.*, 2024

3-Year LCD Follow-Up at Suburban UK Practice



Original research | Open access

BMJ Nutrition, Prevention & Health

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

David Unwin [1,2] Christine Delon [1,3] Jen Unwin,[4] Simon Tobin,[4] Roy Taylor[5]

- **Design: 8 year practice eval of VLCD guidance in primary care practice**
- **Inclusion:** Adults with T2D, median A1C ~7.9%
- **Intervention**: **VLCD** and **weight loss guidance** in suburban **UK practice**. Individual, group, phone consultations provided for patients followed for an average of **33 months**.

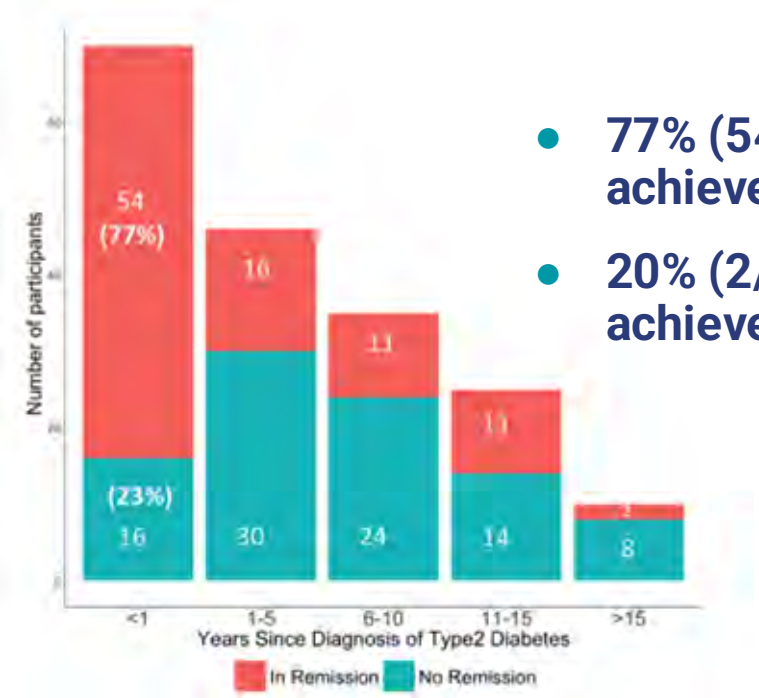
Unwin et al., *BMJ Nutr Prev & Health*, 2023

Summary of Results

- **Results:** 39% (186 / 477) of patients with T2D enrolled in program
  - **51% (n=94) achieved diabetes remission** (A1c<6.5% and not on any glucose-lowering therapy for ≥ 3 months).
  - Patients who achieved remission started with a **lower average HbA1c**.
  - Patients with the **highest baseline HbA1c** were most likely to see **biggest improvement in HbA1c** upon initiating LCD.
  - Improved TG / HDL / LDL / BP and significant weight loss.

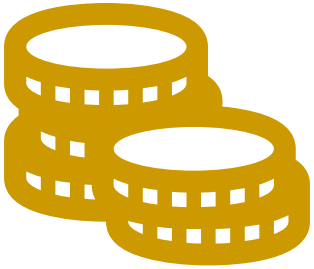
Unwin et al., *BMJ Nutr Prev & Health,* 2023

T2D Duration May Impact Remission Rates



- **77% (54/70)** of patients with T2D duration <1 year **achieved diabetes remission.**
- **20% (2/10)** of patients with T2D duration >15 years **achieved diabetes remission.**

Unwin et al., *BMJ Nutr Prev & Health*, 2023



Myth #6

Low Carbohydrate Diets are Expensive

Cost Comparison Between LCD and Standard Diet

SAD (standard American diet)	LCHF using expensive ingredients	LCHF made cheaper
Toast, margarine, jam, cereal, juice $1.30	Free range eggs, specialty cheeses $1.44	Scrambled eggs with butter and regular shredded cheese $0.64
House salad $6.39 Take out coffee $3.65	Smoked salmon salad $4.49 Homemade creamy coffee $0.24	Leftover roast chicken with salad and cheese $2.48 Homemade creamy coffee $0.24
Chicken, mashed potatoes, ready made gravy, coleslaw, and bread sticks $4.86	Porterhouse steak, organic broccoli, herbed butter $5.75	Lamb chops, herbed butter and salad $3.26
Chocolate mousse cake $5.39	Fresh berries $4.99	Frozen berries $1.75
TOTAL $21.59	**TOTAL $16.91**	**TOTAL $8.57**

Low Carb on a Budget is Possible!

- ✅ Plan – *make a shopping list*
- ✅ Shop – *find cheaper alternatives*
- ✅ Cook – *in bulk and enjoy leftovers*

Low Carbohydrate Facts

1. Low carb diets *may have side effects that can be managed.*
2. Low carb diets *may induce nutritional ketosis which is a safe, physiologic state.*
3. Low carb diets *can improve measures of cardiometabolic health.*
4. Low carb diets *are neither high protein diets nor associated with kidney damage.*
5. Low carb diets *can be sustainable.*
6. Low carb diets *can be budget-friendly.*

Thank you!

Questions?