

# Two Steps to Receive CME/CE Credit

## STEP 1:

Text in CE Code **83342** to **833-256-8390**  
by 1:00 PM on **September 27<sup>th</sup>**

Scan me to open a text message!



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

## STEP 2:

Complete the required online evaluation  
by **October 12, 2025**

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

Refer to full CE document for additional CE information. For assistance, email [CHEcme@corewellhealth.org](mailto:CHEcme@corewellhealth.org)

# MCT2D Learning Community Series 2025

## Low Carbohydrate 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.

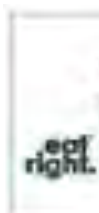
This activity was planned by and for the healthcare team, and learners will receive 1.0 Interprofessional Continuing Education (IPCE) credit for learning and change.

**Medicine CME:** Corewell Health Southeast Michigan designates this live activity for a maximum of 1.0 *AMA PRA Category 1 Credit™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Nursing CE:** Corewell Health Southeast Michigan designates this activity for a maximum of 1.0 ANCC contact hour. Nurses should claim only the credit commensurate with the extent of their participation in the activity.

**Pharmacy CE:** Corewell Health Southeast Michigan designates this activity for 1.0 ACPE contact hour. ACPE Universal Activity Number (UAN): JA4008259-9999-25-061-L01-P. Learners should claim only the credit commensurate with the extent of their participation in the activity. Credit will be uploaded to the NABP CPE Monitor within 30 days after activity completion. Per ACPE rules Corewell Health Southeast Michigan does not have access nor the ability to upload credits requested after 60 days. It is the individual learner's responsibility to provide the correct NABP ID and DOB (MMDD) to receive credit.

**Dietetic CPEU:**

|   |   |
|---|---|
|  <p><b>Commission on<br/>Dietetic Registration</b><br/><small>the credentialing agency for dietitians</small><br/>Academy of Nutrition and Dietetics</p> | <p>Completion of this RD/DTR profession-specific or IPCE activity awards CPEUs (One IPCE credit = One CPEU).</p> <p>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).</p> <p>RDs and DTRs are to select activity type 102 in their Activity Log. Sphere and Competency selection is at the learner's discretion.</p> |
|---|---|

## 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.



# Learning Community Event 2025 Series: Updates on Low Carbohydrate Diets

September 26<sup>th</sup>, 2025

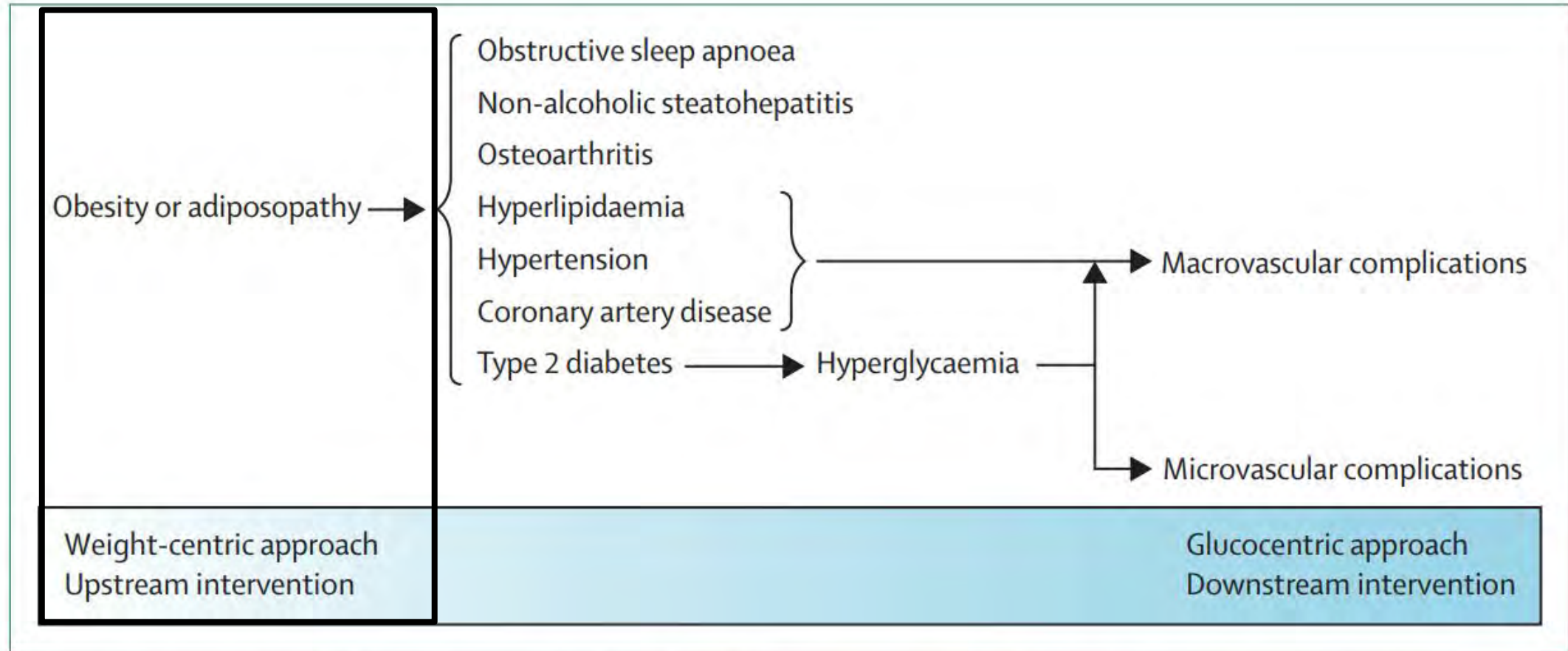
**Rina Hisamatsu, MPH, RDN**

Michigan Collaborative for Type 2 Diabetes  
Domino's Farms Family Medicine

# Overview

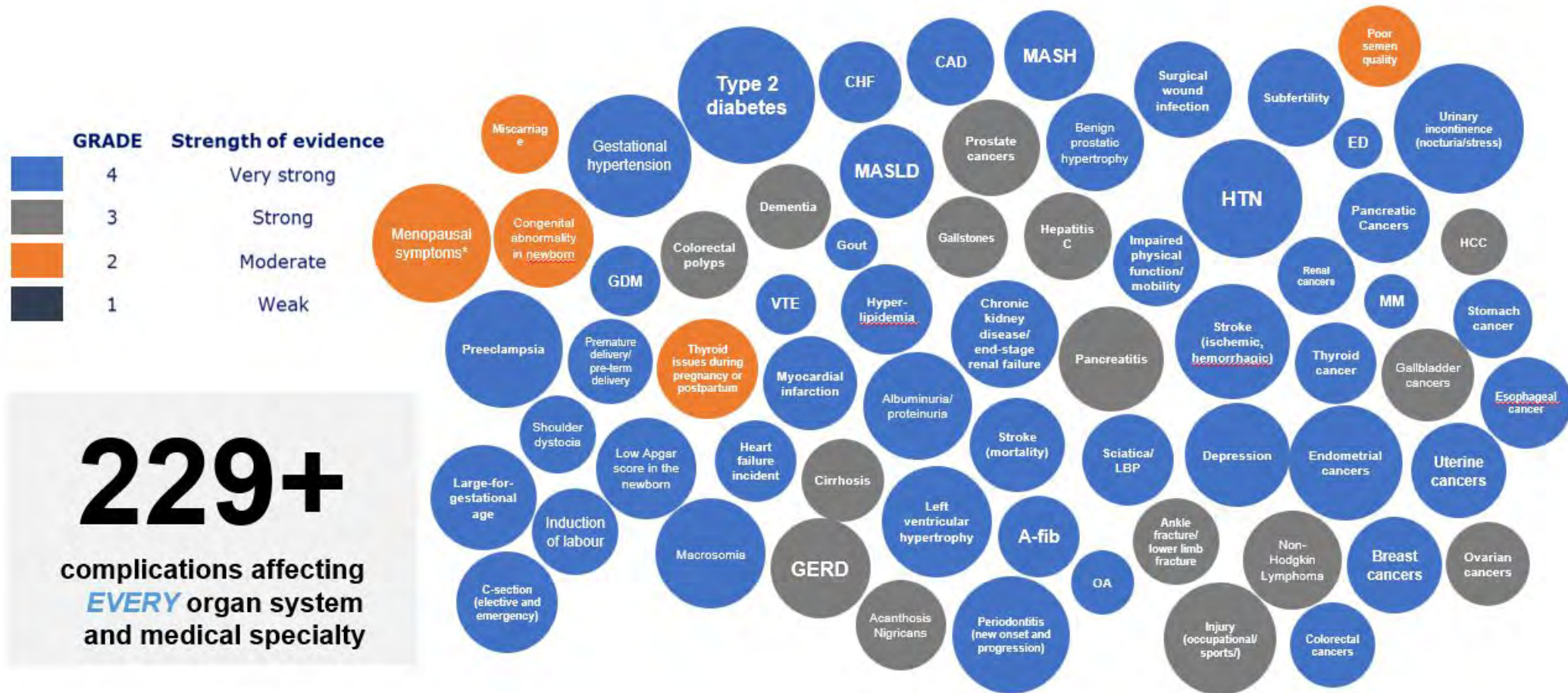
1. Review the foundations of low carbohydrate diets
2. Low carbohydrate diet Patient-Reported Outcomes (PROs)
3. Updates in LCD literature
4. Pre-submitted Q&As

# Addressing Upstream Interventions to Treat Chronic Disease





# Comorbidities Associated with Obesity



Yuen et al. Obesity Week 2016. Oct 31-Nov 4 2016. New Orleans: T-P-3166

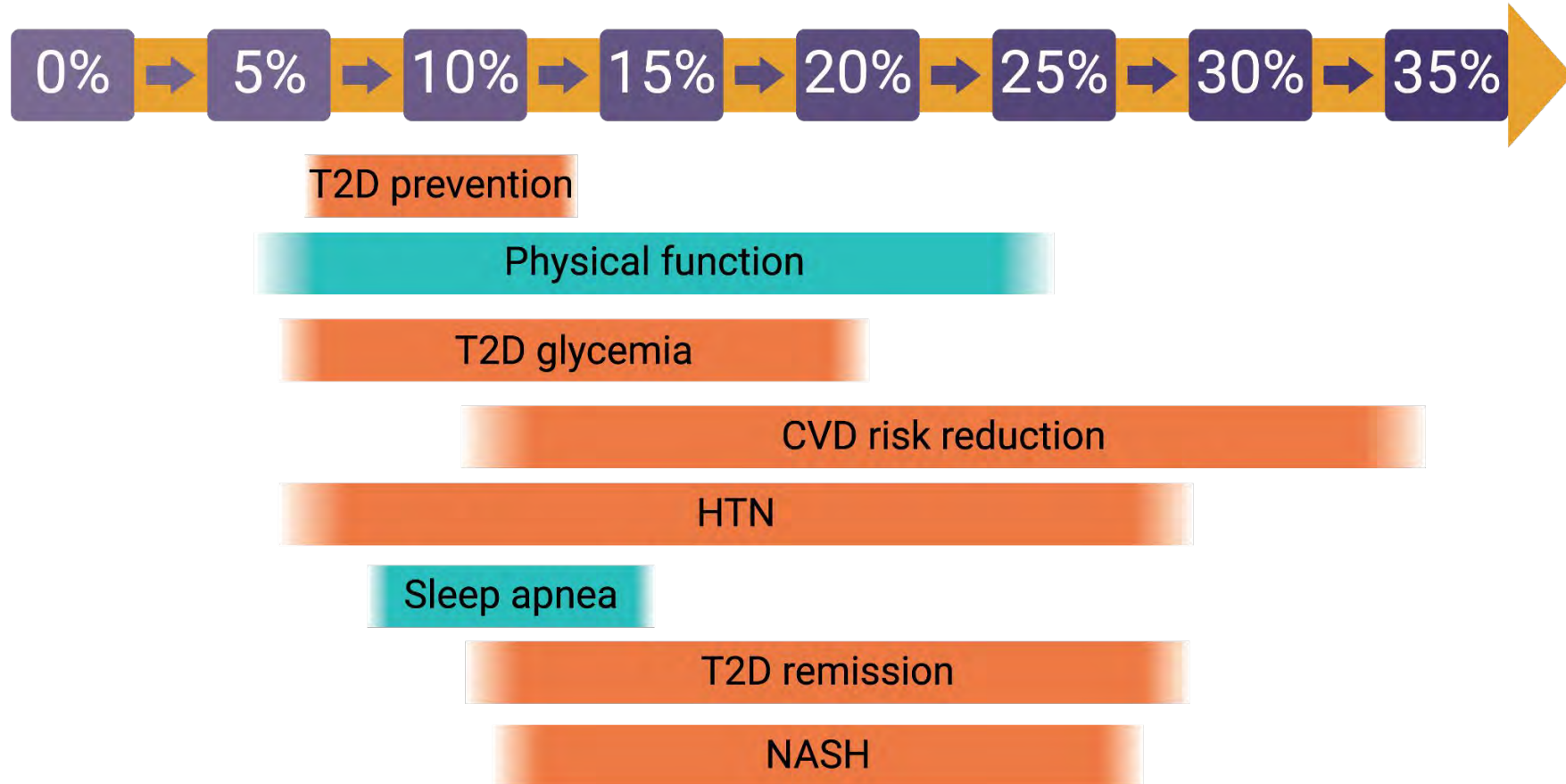
# Addressing Upstream Interventions to Treat Chronic Disease

*“Building positive health behaviors and maintaining psychological well-being are foundational for achieving diabetes management goals and maximizing quality of life.”*



# Weight Loss Improves Glycemic Control

Thresholds of % weight loss



# Multiple Weight-Loss Treatment Options



Nutrition &  
lifestyle  
counseling



Meal  
replacements



Anti-obesity  
medications



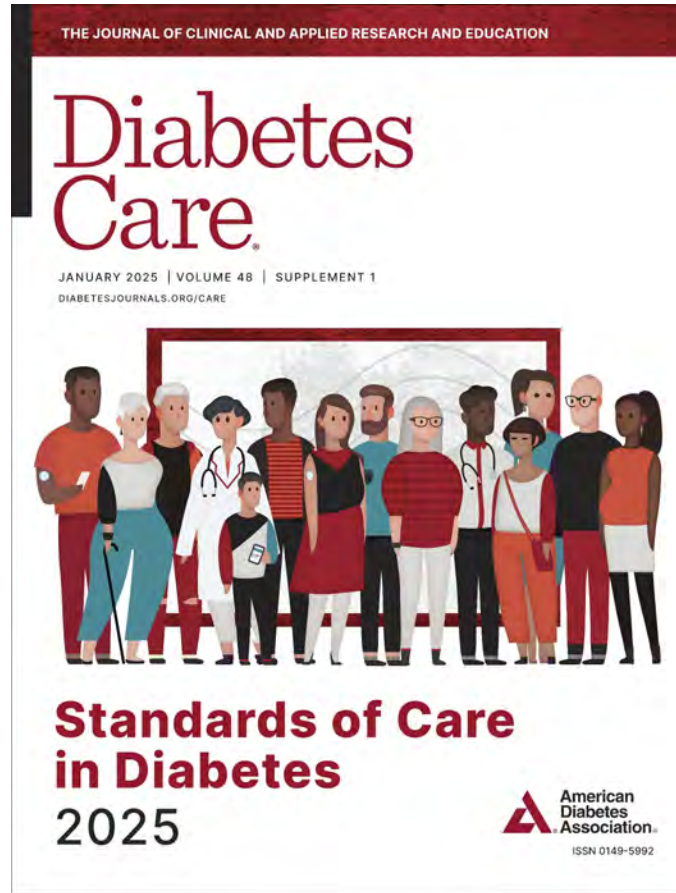
Bariatric  
surgery

# ADA's Dietary Change Recommendations

- 5.13** For diabetes prevention and management of people with prediabetes or diabetes, recommend **individualized meal plans** that keep nutrient quality, total calories, and metabolic goals in mind, **B** as data do not support a specific macronutrient pattern.
- 5.14** Eating patterns should **emphasize key nutrition principles** (inclusion of nonstarchy vegetables, whole fruits, legumes, lean proteins, whole grains, nuts and seeds, and low-fat dairy or nondairy alternatives) and minimize consumption of red meat, sugar-sweetened beverages, sweets, refined grains, processed and ultraprocessed foods in people with prediabetes and diabetes. **B**
- 5.15** **Consider reducing overall carbohydrate intake** for adults with diabetes to improve glycemia, as this approach may be applied to a variety of eating patterns that meet individual needs and preferences. **B**

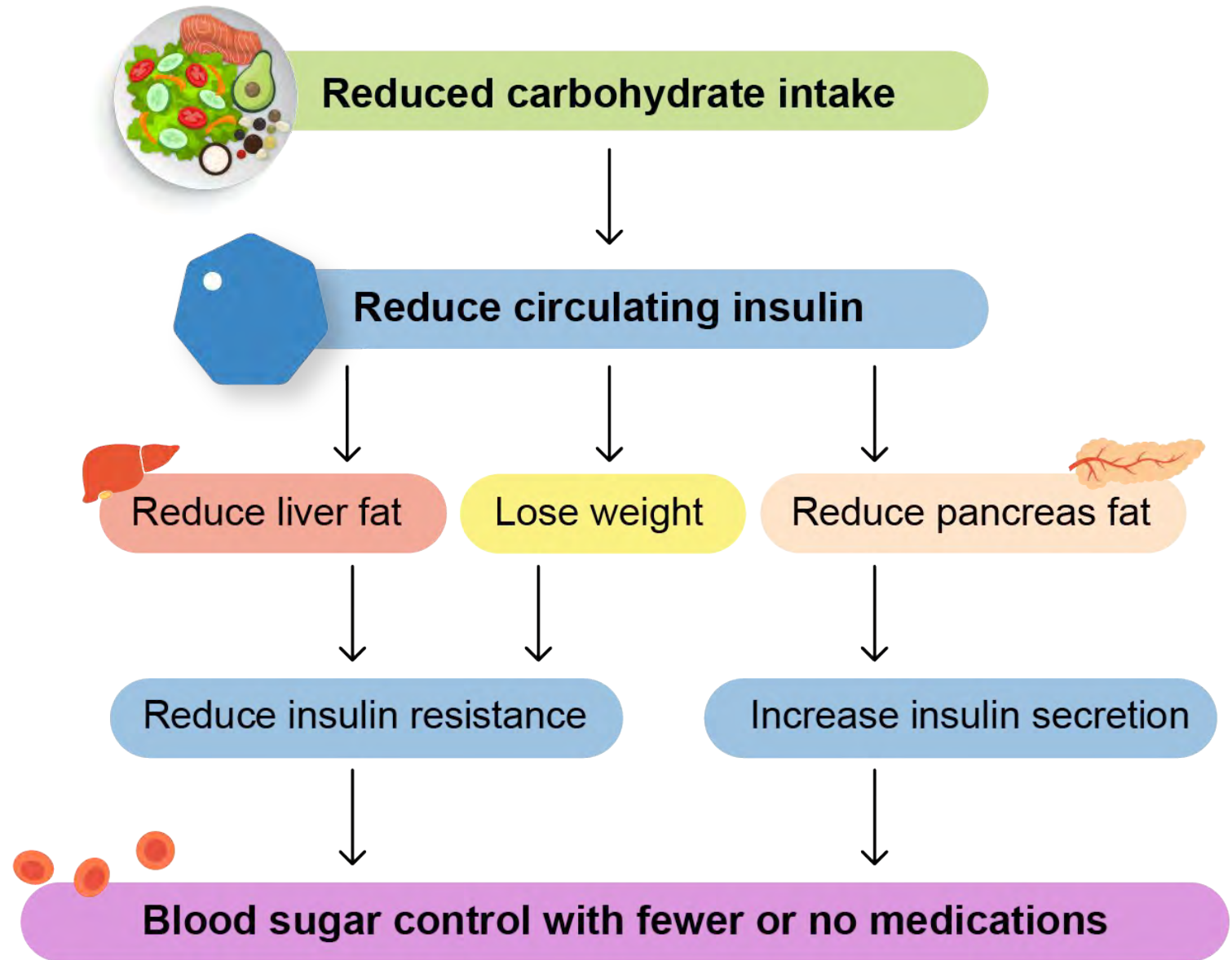


# The ADA Supports Carbohydrate Restriction as Viable Approach to Diabetes Management



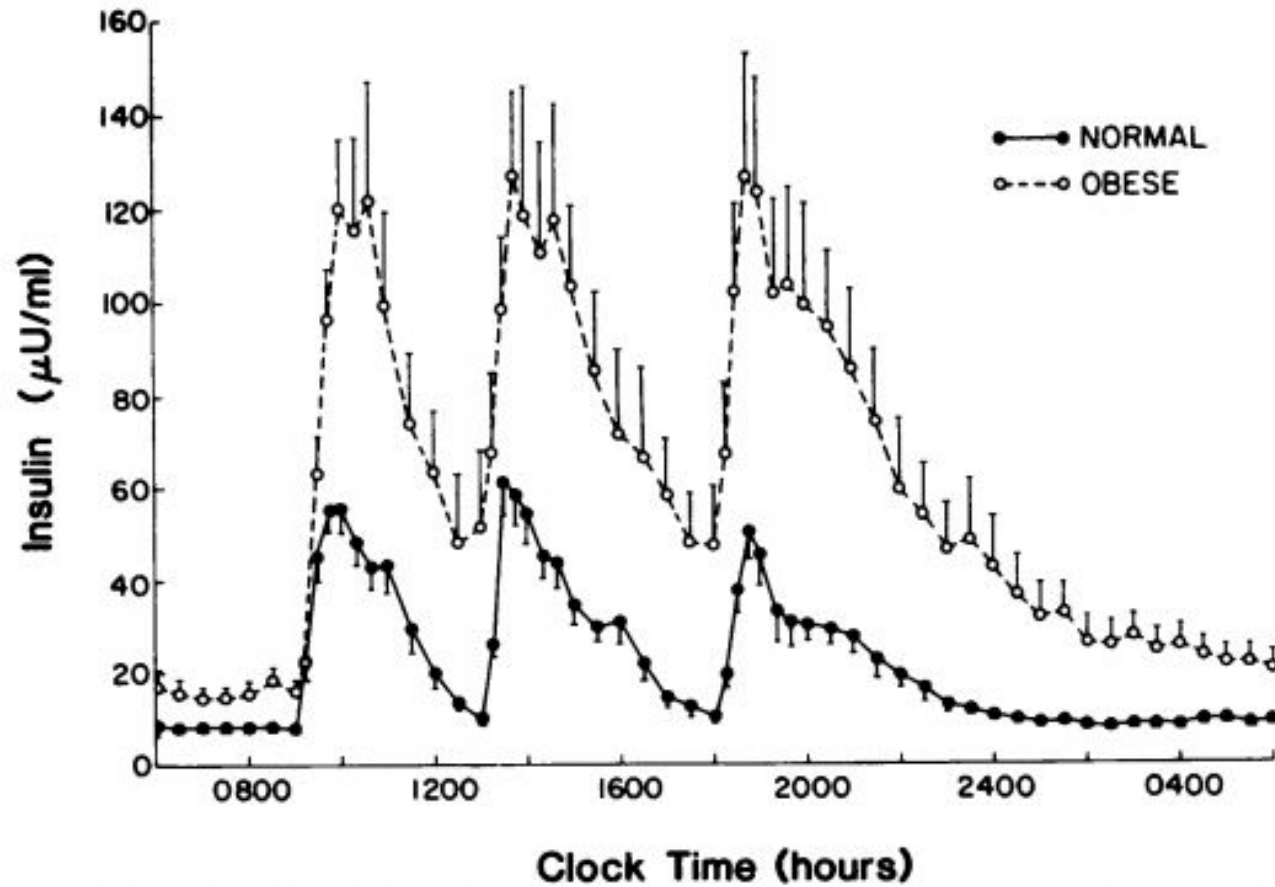
**“Consider reducing overall carbohydrate intake for adults with diabetes to improve glycemia, as this approach may be applied to a variety of eating patterns that meet individual needs and preferences.”**

# Physiologic Rationale for Carb-Restriction



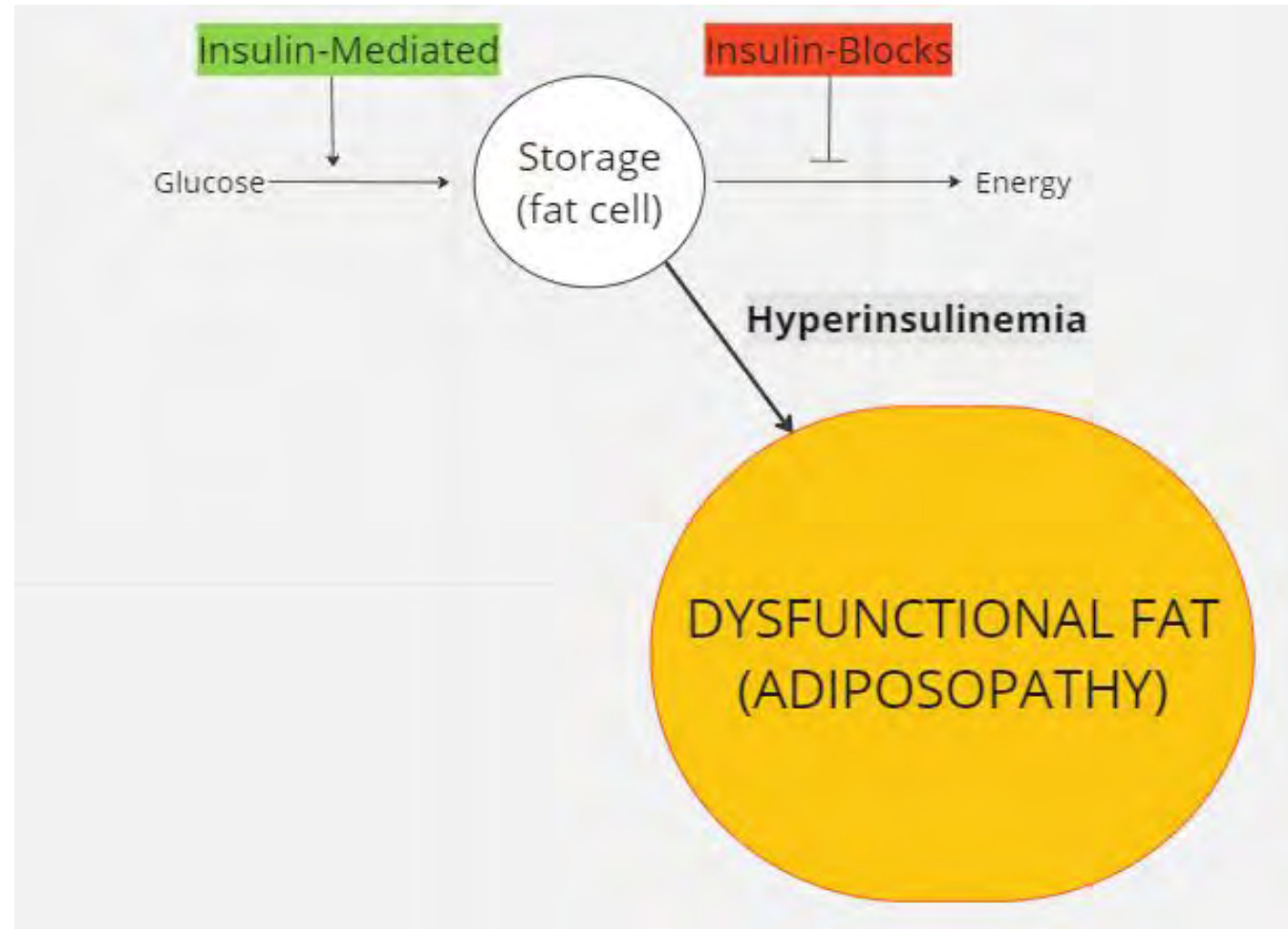


# Hyperinsulinemia

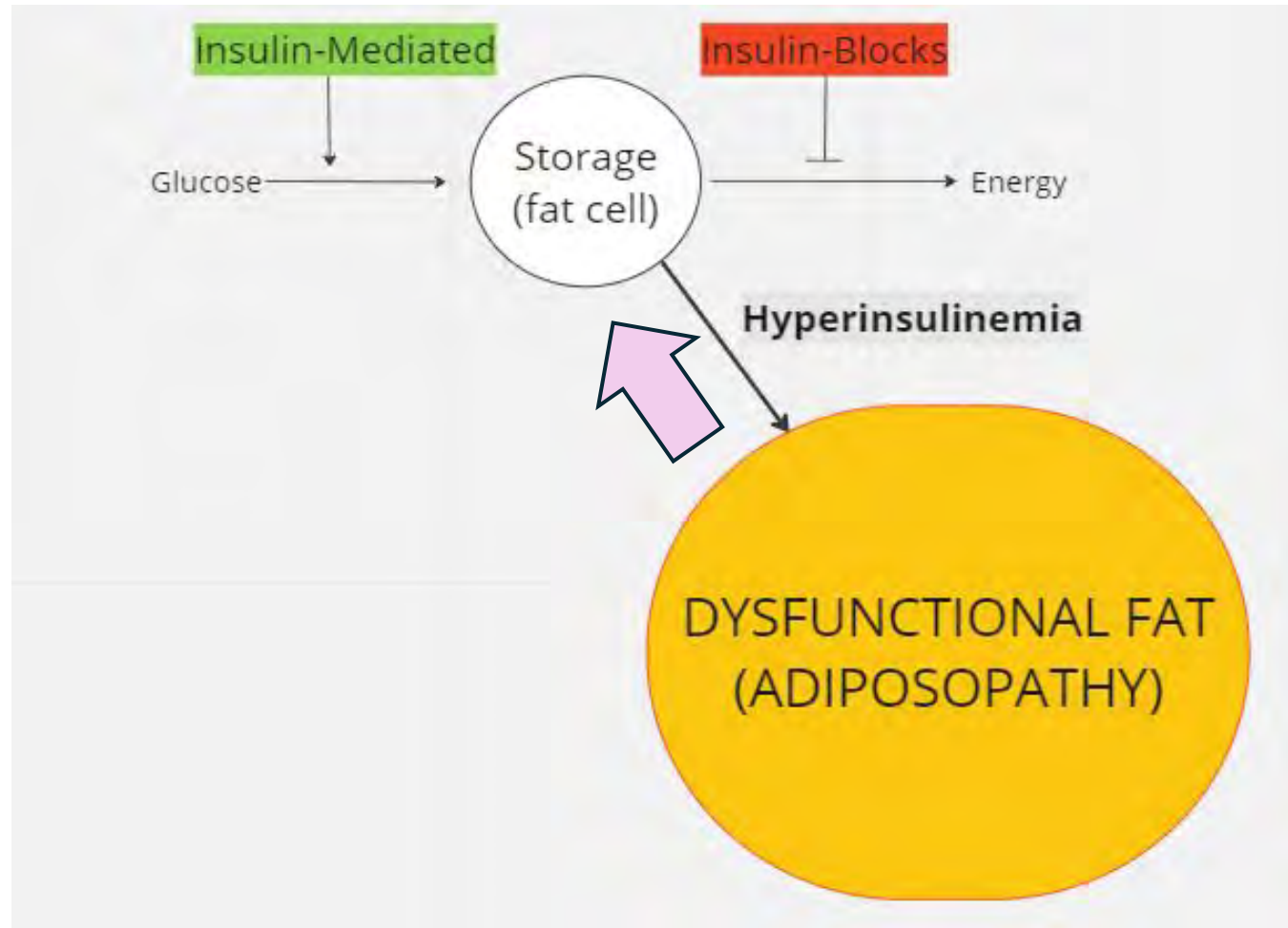


Polonsky et al., *J Clin Invest.*, 1988

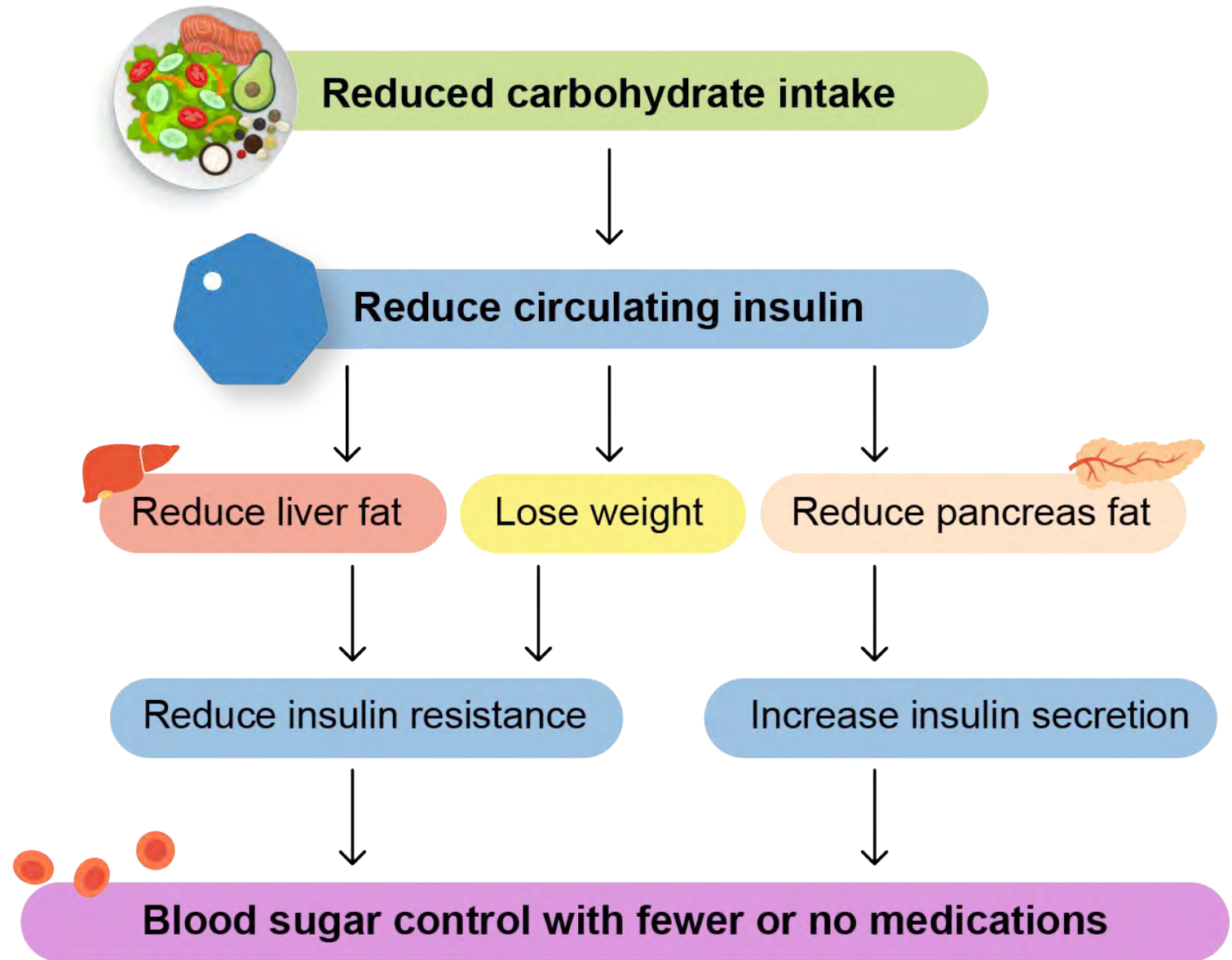
# Insulin and Adipose Cells



# Insulin and Adipose Cells



# Physiologic Rationale for Carb-Restriction



# Definitions of Low Carbohydrate Diets

|                       | % 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



# Definitions of Low Carbohydrate Diets

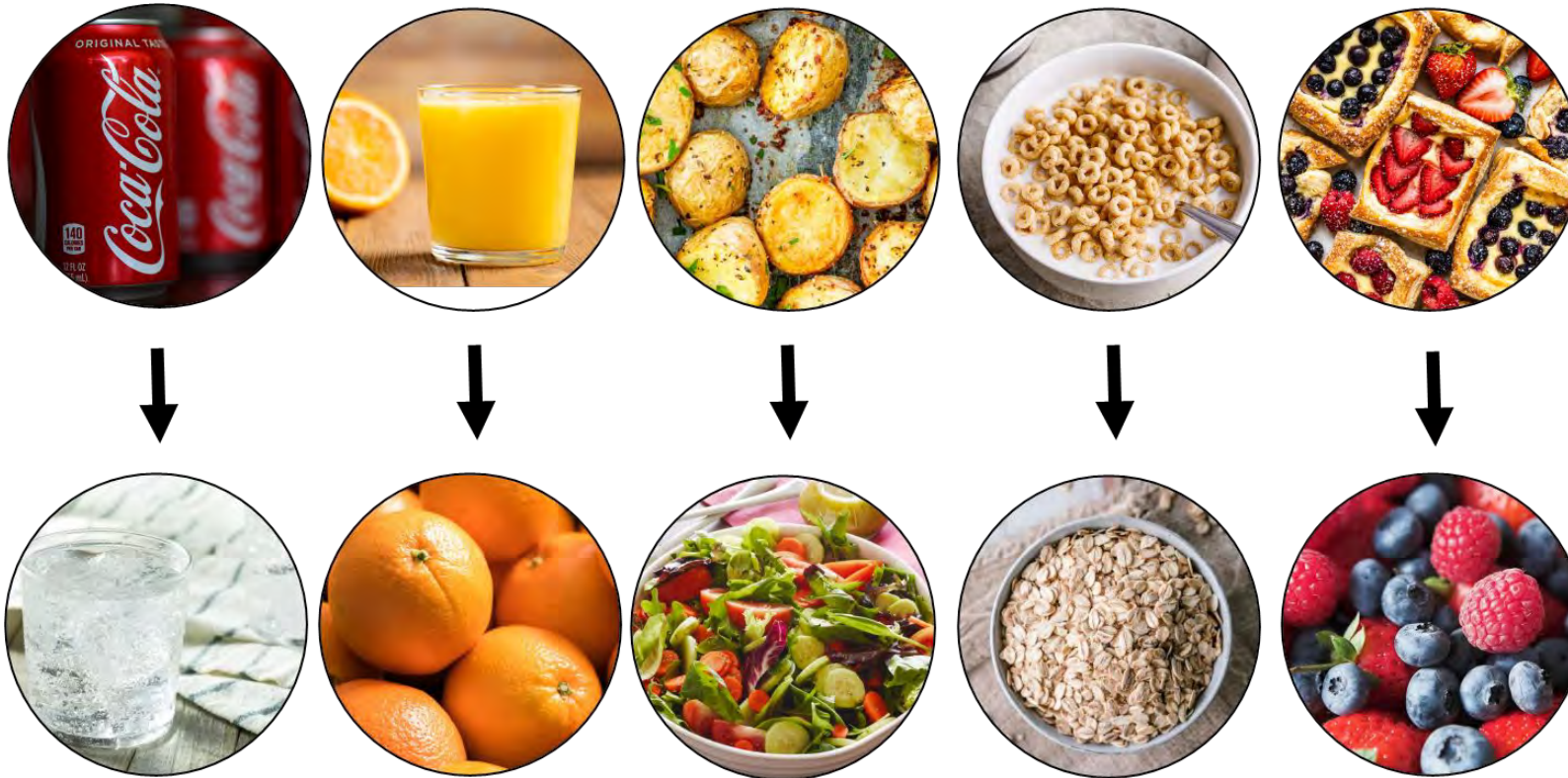
|                       | % total energy from carb* |              |               |            |
|-----------------------|---------------------------|--------------|---------------|------------|
| Diet type             | ≤10%                      | >10% to 26%  | >26% to 45%   | >45%       |
| Very 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

# Support Change Relative to Baseline Diet



# Support Change Relative to Baseline Diet



Prioritize monounsaturated fats; adequate protein; higher fiber carbs / starches



# Consider Just Changing Breakfast

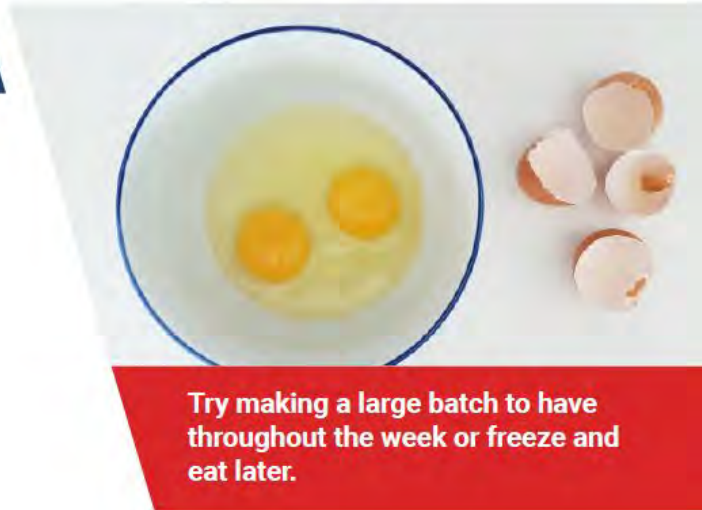
## Low-Carbohydrate Breakfasts

To help you lose weight, we will begin building low-carb eating habits. We will start by changing your breakfasts and snacks.

Here are some breakfast ideas:

- ✓ Scrambled eggs or an omelet cooked with butter or olive oil. Try adding low-carb veggies or cheese or some avocado on the side.
- ✓ Full-fat, unsweetened yogurt with walnuts or pecans.
- ✓ A crustless quiche (or frittata): try broccoli, bacon, and swiss cheese or mushroom, spinach, and cheddar cheese.
- ✓ Coffee with whipping or heavy cream (not half & half).
- ✓ Low-carb pancakes, waffles, muffins, or shakes.  
*Tip: search online for "low-carb pancakes" or "keto pancakes" for ideas!*

Look for recipes with no more than about 5 net carbs in a serving.



Original Research Article

## Impact of a Low-Carbohydrate Compared with Low-Fat Breakfast on Blood Glucose Control in Type 2 Diabetes: A Randomized Trial

Barbara F. Oliveira<sup>1</sup>, Courtney R. Chang<sup>2,3</sup>, Kate Oetsch<sup>2,3</sup>, Kaja Falkenhain<sup>1</sup>, Kara Crampton<sup>1</sup>, Matthew Stork<sup>1</sup>, Malvinder Hoonjan<sup>4</sup>, Thomas Elliott<sup>5</sup>, Monique E. Francois<sup>2,3</sup>, Jonathan P. Little<sup>1</sup>  

Restricting carbohydrates at breakfast is sufficient to reduce 24-hour exposure to postprandial hyperglycemia and improve glycemic variability

Courtney R. Chang, Monique E. Francois, and Jonathan P. Little

School of Health and Exercise Sciences, University of British Columbia, Okanagan, Canada

# Carbohydrate Comparisons



**20**  
grams of carbs  
on each plate



**20**  
grams of carbs  
on each plate

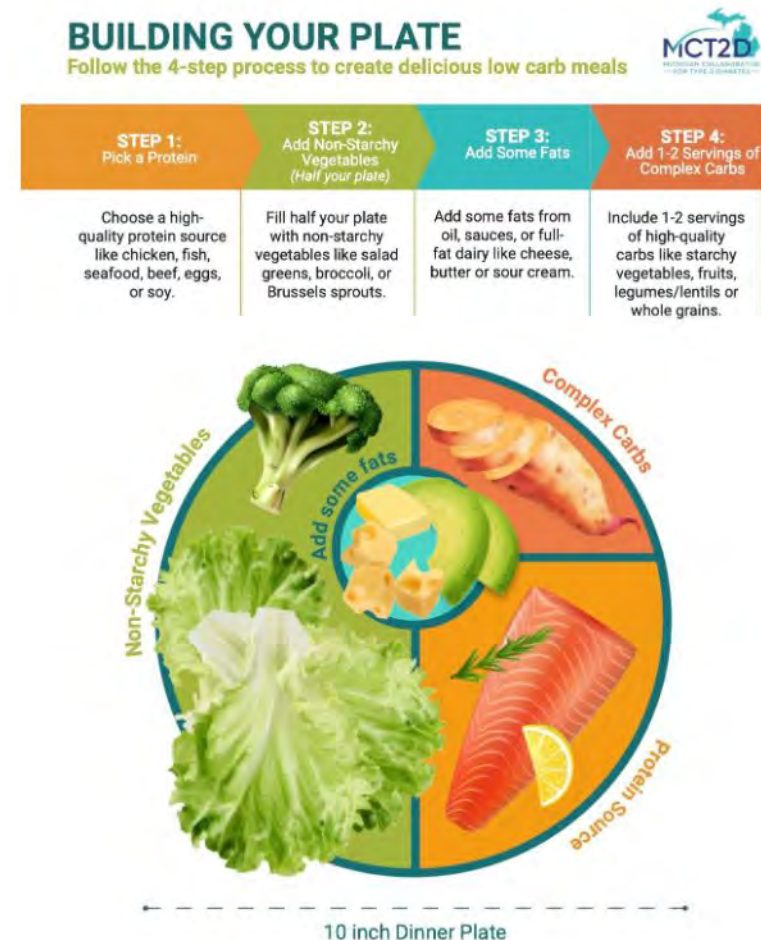




# Meal Plan Basics: Low Carb (<130g carbs/d)

## 4-step process

1. Pick a protein
2. Add non-starchy vegetables
3. Add some fats for flavor
4. Add some complex carbs



# The Low Carb Jumpstart 2.0!



[Take a tour of the new website and its features!](#)



HOME



PLAN



COOK



LEARN

## WELCOME TO JUMPSTART

A low carb lifestyle for  
Type 2 Diabetes

DOWNLOAD THE  
WELCOME PACKET



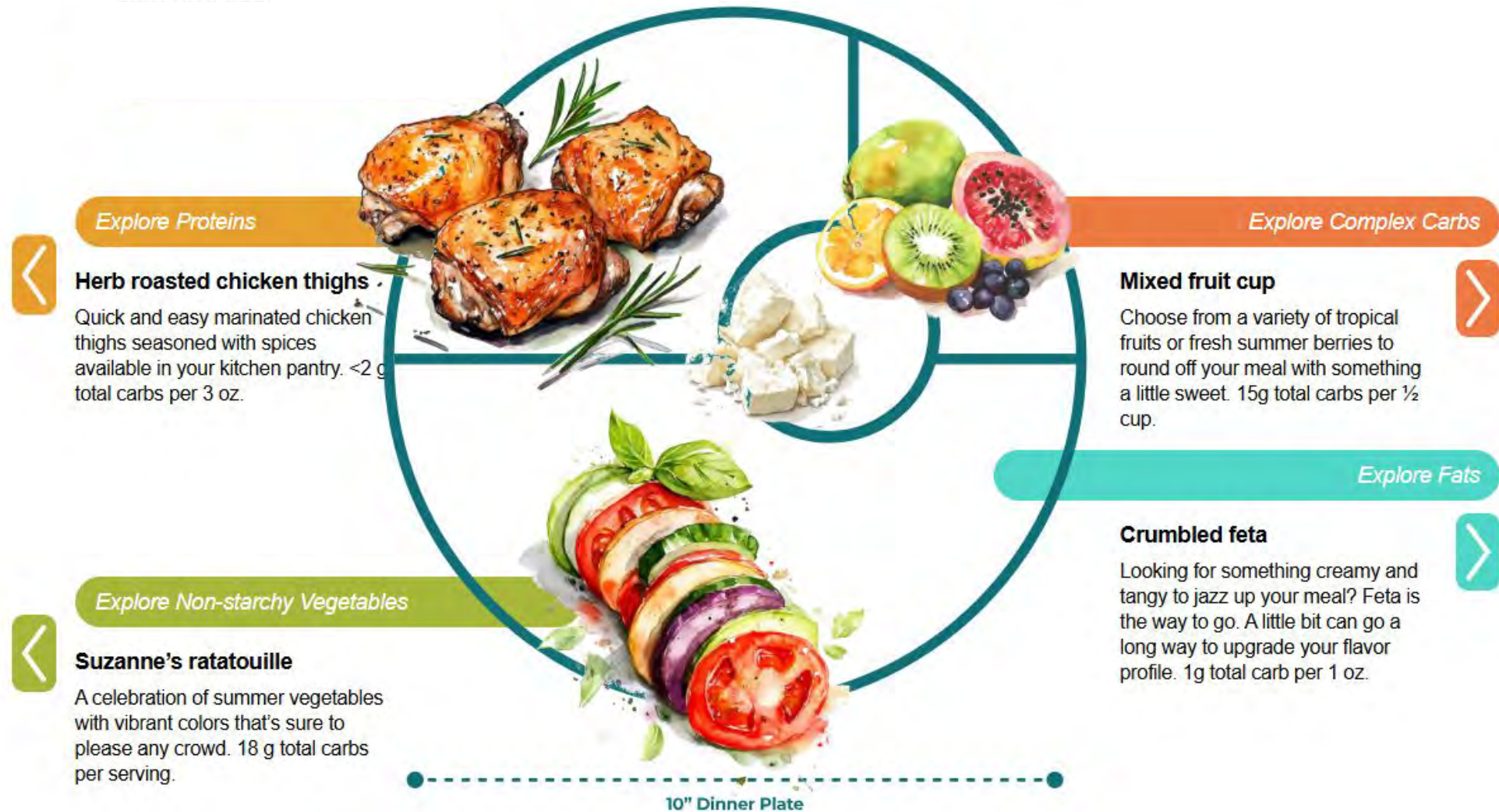
Recipes, meal planning guides, shopping list, goal setting/tracking tools, blog posts and more!



<https://jumpstart.mct2d.org>



# Interactive Build Your Plate Tool



# FAQs on The Jumpstart Blog Page

Low-carb on the road

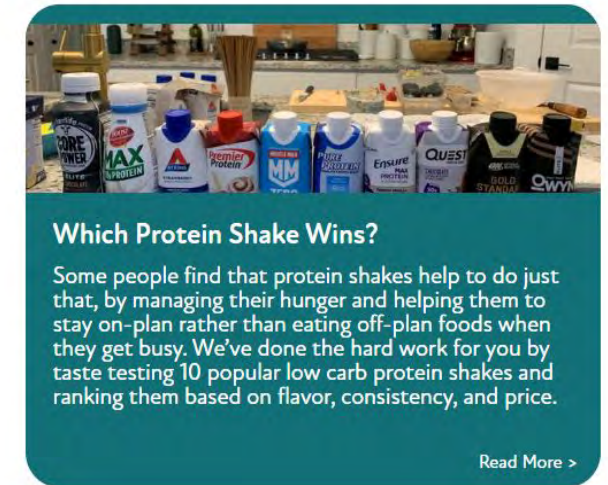
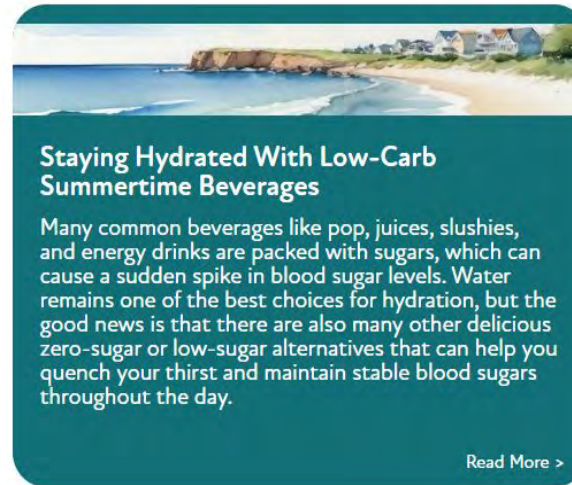
Dollar store roundup

Navigating holidays

Low carb protein shakes  
taste test

Staying hydrated with  
low-carb beverages

...And more!





# CGM is Another Tool to Support Behavior Change



Institute of Learning

**FREE 5 CEUs**

**Course expires December 31, 2025**

Login



## **PROGRAM**

**Supporting Healthy Eating Habits through Continuous Glucose Monitors (CGMs)**



# Using AGP Report for CGM Interpretation

## AGP Report

April 11, 2024 - April 24, 2024 (14 Days)

LibreView

### GLUCOSE STATISTICS AND TARGETS

April 11, 2024 - April 24, 2024 14 Days  
Time CGM Active: 94%

Ranges And Targets For Type 1 or Type 2 Diabetes

| Glucose Ranges            | Targets % of Readings (Time/Day) |
|---------------------------|----------------------------------|
| Target Range 70-180 mg/dL | Greater than 70% (16h 48min)     |
| Below 70 mg/dL            | Less than 4% (58min)             |
| Below 54 mg/dL            | Less than 1% (14min)             |
| Above 180 mg/dL           | Less than 25% (6h)               |
| Above 250 mg/dL           | Less than 5% (1h 12min)          |

Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

Average Glucose 220 mg/dL

Glucose Management Indicator (GMI) 8.6%

Glucose Variability 20.1%

Defined as percent coefficient of variation (%CV); target  $\leq 36\%$

Goal  $\leq 36\%$

### TIME IN RANGES



Goal  $\geq 70\%$

# CGMs Can Further Guide Nutrition Conversations

Choose an “area of focus” based on CGM data to come with a dietary action plan

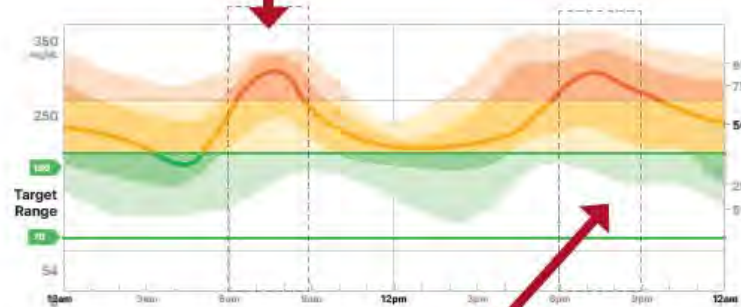
## AREA OF FOCUS: BREAKFAST

I notice a peak in glucose around 6–9 a.m.

- Does your glucose peak before or after eating?
- Can you tell me about your morning and the types of foods/beverages you eat or drink?
- How would you feel about exploring what happens to your glucose if you add some protein, non-starchy vegetables, or higher fiber foods to your morning meal?

## TIPS

- Encourage replacing sugar-sweetened beverages, such as juice or sweetened coffee/tea, with unsweetened or sugar-free beverages—**ideally water**.
- Suggest **reducing** the portion of foods that raise glucose above target and **replacing** with healthy foods that do not raise glucose as much (non-starchy vegetables, whole grains, lean protein).



## AREA OF FOCUS: EVENING

I notice a peak in glucose between 6–9 p.m.

- Can you describe your evening meal or any snacks around this time?
- Would you consider substituting some of your usual foods for ½ plate of non-starchy vegetables?
- What do you think would happen if you took a walk after your evening meal?

## TIPS

- Suggest replacing highly processed foods with whole foods. Instead of fries or chips, try a **side salad**.
- Encourage the **Diabetes Plate Method**.
- Ask patients what changes they are willing to make to their usual food and beverage choices.



# Meal Plan Basics: Very Low Carb (<50g carbs/d)

## 3-step process

1. Pick a protein
2. Add non-starchy vegetables
3. Add some fats for flavor

*NET carbs may help to encourage more fiber-containing foods.*

**20-35g NET carbs/day**

### BUILDING YOUR PLATE (<50g carbs/day)

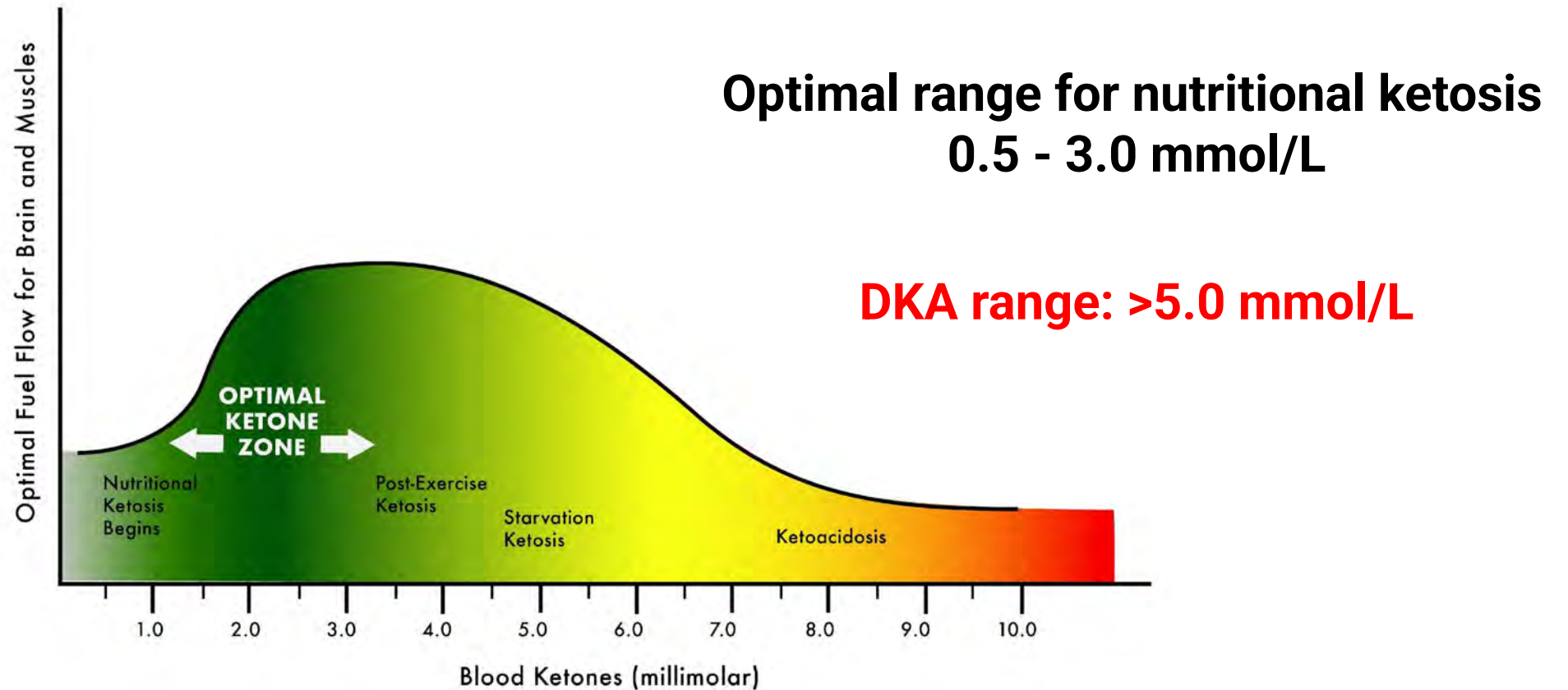
Follow the 3-step process to create delicious very low carb meals



MCT2D.org



# Nutritional Ketosis ≠ Ketoacidosis





# Using “Net Carbohydrate” Encourages Intake of More Fiber-Rich Foods

**Net carbohydrate:** non-fiber grams of carbohydrates in a food. Calculated by subtracting grams of fiber from total carbohydrate.

## General recommendations:

- ★ Can use net carbs for **very low carb** meal plan 20-35 g net carbs per day.

| Nutrition Facts   |                     |
|---|---------------------|
| 4 servings per container  |                     |
| <b>Serving size</b>   | <b>1 cup (180g)</b> |
| Amount per serving  |                     |
| <b>Calories</b>   | <b>245</b>          |
| % Daily Value*  |                     |
| <b>Total Fat</b> 12g  | <b>14%</b>          |
| Saturated Fat 2g  | <b>10%</b>          |
| Trans Fat 0g  |                     |
| <b>Cholesterol</b> 8mg  | <b>3%</b>           |
| <b>Sodium</b> 210mg   | <b>9%</b>           |
| <b>Total Carbohydrate</b> 34g   | <b>12%</b>          |
| Dietary Fiber 7g  | <b>25%</b>          |
| Total Sugars 5g   |                     |
| Includes 4g Added Sugars  | <b>8%</b>           |
| <b>Protein</b> 11g  |                     |
| Vit. D 4mcg 20%   | Calcium 210mg 16%   |
| Iron 3mg 15%  | Potas. 380mg 8%     |
| Vit. A 84mcg 9%   | Vit. C 10mg 11%     |
| Zinc 7mg 17%  | Iodine 15mcg 10%    |
| * The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice. |                     |

# A VLCD is NOT a High Protein Diet

A very-low carbohydrate (ketogenic) meal plan is a moderate-protein diet.

In general, the distribution of total energy intake on VLCDs = <10% from CHO, 20-30% (or less) from protein and  $\geq 70\%$  from fat.

# Mitigating Potential Side Effects

| Potential side effects  | Mitigation strategies  |
|---|--|
| Headache, fatigue, brain fog, irritability<br>(i.e., <b>keto flu or induction flu</b> ) | <ul style="list-style-type: none"><li>• Gradual carb reduction (e.g., 1 meal per wk)</li><li>• Liberalize salt and water intake</li><li>• Liberalize fat intake to minimize hunger</li><li>• Often resolves within a few days or weeks</li></ul> |
| <b>Muscle cramps</b>  | <ul style="list-style-type: none"><li>• Liberalize salt and water intake</li><li>• Consider magnesium supplement</li></ul>   |
| <b>Constipation</b>   | <ul style="list-style-type: none"><li>• Liberalize salt and water intake</li><li>• Increase intake of non-starchy vegetables</li><li>• Consider Milk of Magnesia</li></ul>   |
| <b>Bad breath</b>   | <ul style="list-style-type: none"><li>• Liberalize salt and water intake</li><li>• Good oral hygiene</li><li>• Breath fresher</li><li>• Often resolves within 2-4 weeks</li></ul>  |

# Potential Risks

- Risk of ketoacidosis
- Risk of hypoglycemia
- Risk of hypotension
- Risk of increased LDL



# Potential Risks

- Risk of ketoacidosis (**euglycemic**) in patients taking **SGLT2 inhibitors**
- Risk of hypoglycemia in **patients with T1DM** or those who are taking **glucose-lowering medications** (e.g., insulin and SUs)
- Risk of hypotension in **patients taking anti-hypertensive medications**
- Risk of increased LDL is **possible but addressable**

# Consider Anti-Hyperglycemic Medications



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



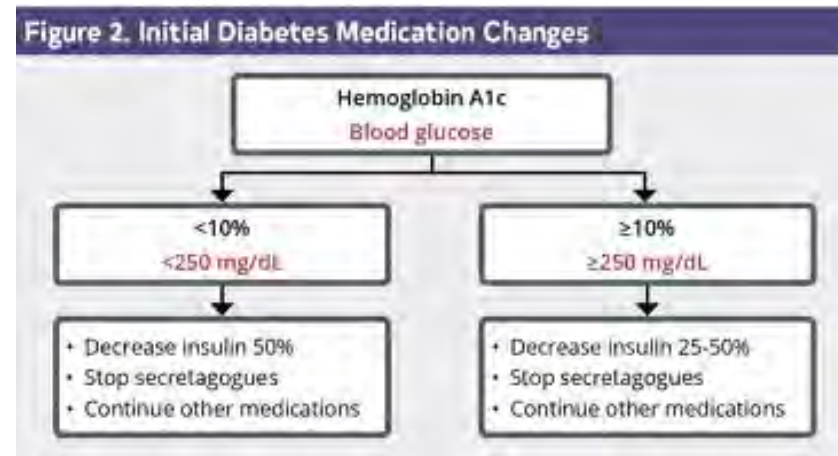
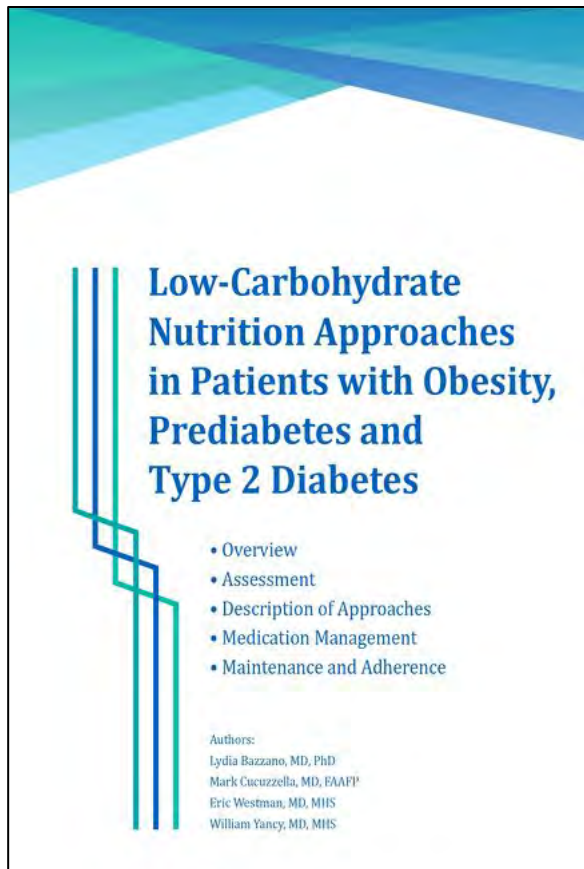
Basal insulin  
Thiazolidinediones



Biguanides  
Incretin mimetics  
DPP 4 inhibitors

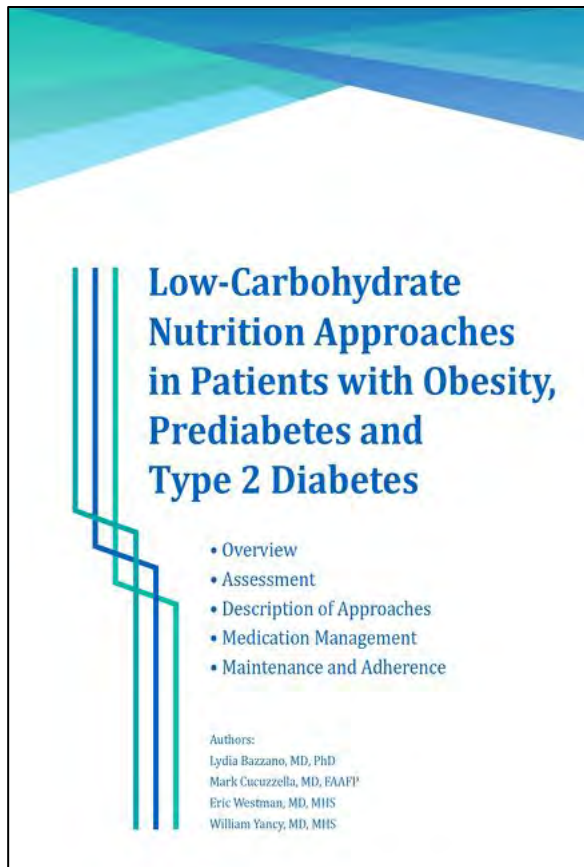
\*Stop if <50 grams of carbs to avoid rare risk of euDKA

# 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

# Adjust BP Medications to Avoid Hypotension

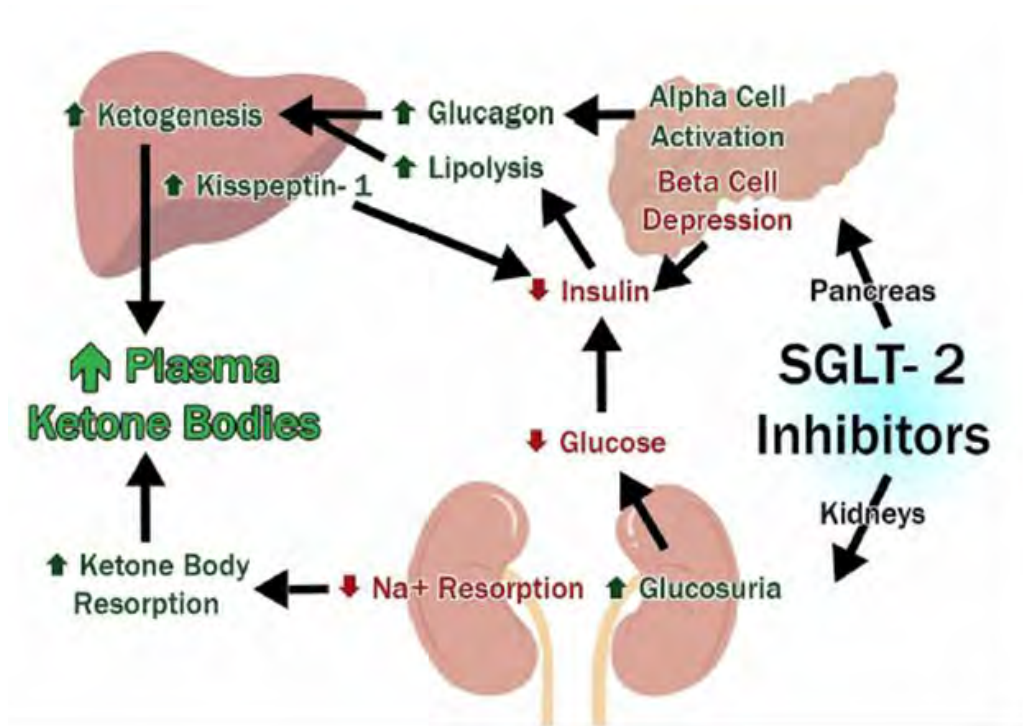


| Table 3. Blood Pressure Medication Adjustment |           |                          |
|---|-----------|--------------------------|
| Blood pressure, mm Hg                         |           | Change in one medication |
| Systolic                                      | Diastolic |                          |
| <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.



# Rare Risk of Euglycemic Diabetic Ketoacidosis



**Proposed Mechanism**

## Risk factors:

- Dietary change (e.g., fasting, very low-calorie or very low-carb)
- NPO status
- Acute illness

## Signs and symptoms:

- Abdominal pain, vomiting
- Fatigue, weakness
- Excessive thirst
- Change in MS

# Low Carb Diet Patient-Reported Outcomes

# LCD Patient Reported Outcomes

- In 2023, 3 POs from MCT2D decided to focus on a quality improvement initiative related to **enhancing low carbohydrate education for patients.**
- Survey 1: Individuals who were newly recommended a low carbohydrate diet.
- Survey 2: Physicians who counseled patients on LCDs in their practice.



# LCD Resources

Printed handouts were the most widely distributed **type** of resource and the most requested by their patients.

Here are the **Top 5 printed resources** received by patients:-

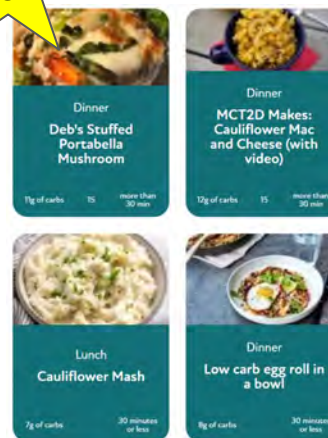


Low Carb Groceries



| Head of...    | Try these!  |
|---------------|---|
| Potatoes      | Replace potatoes in your recipe with a low-carb root vegetable. <ul style="list-style-type: none"><li>Jicama</li><li>Turip</li><li>Kohlrabi</li><li>Rutabaga</li><li>Daikon radish</li></ul>                                |
| Bread & Wraps | Turn any sandwich into a leafy green wrap! You can wrap your fillings with: <ul style="list-style-type: none"><li>Iceberg lettuce</li><li>Romaine lettuce</li><li>Collard greens</li><li>Swiss chard</li><li>Kale</li></ul> |
| Rice          | Riced cauliflower is an excellent swap for rice. It works well seasoned with fresh herbs, or use it to make your favorite fried rice dish!  |
| Corn          | Swap corn with your favorite non-starchy vegetables like asparagus, green beans, zucchini, broccoli, cauliflower, sautéed etc.  |

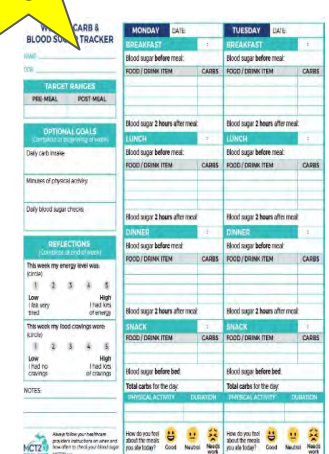
Low Carb Substitutions



Print Low Carb Recipes



Sample Meal Plans



Carb Tracking Log

# LCD Resources

Patients were also interested in **websites** and **video resources**...

## Intro to Low Carb Video Series



### Intro to Low Carb: Part 1

Rina Hisamatsu, MPH, RD, is a registered dietitian and health educator for the Michigan Collaborative for Type 2 Diabetes. Part 1 takes you through the basics of a low carb lifestyle for type 2 diabetes management. Walk through a lesson on carbohydrates, reading the nutrition facts label, meal planning and more.



### Intro to Low Carb: Part 2

Part 2 includes strategies for budget savvy meal planning, stocking low carb pantry staples, low carb breakfast makeovers, and low carb substitutes for high carb staples.



### Intro to Low Carb: Part 3

Part 3 summarizes key takeaways from parts 1 and 2, and applies them to situations in the real world like navigating social gatherings, dining out, and facing challenges.

## Low Carb Cooking Demos



## Low Carb Jumpstart



## WELCOME TO JUMPSTART

A low carb lifestyle for type 2 diabetes

DOWNLOAD THE WELCOME PACKET



[MCT2D | Intro to Low Carb Video Series](#)

[Cooking Demo | MCT2D Makes](#)

[The Low Carb Jumpstart | MCT2D](#)

# Top LCD Challenges

What patients say...

1. Cravings for sweet or starchy foods
2. Difficult to sustain long term
3. Hard to manage at social gatherings

What providers say...

1. Cravings for sweet or starchy foods
2. Challenging to track carbohydrates daily
3. Difficult to sustain long term



# FAQs on The Jumpstart Blog Page

Low-carb on the road


Low-carb on a budget

Navigating holidays

Low carb protein shakes  
taste test

Staying hydrated with  
low-carb beverages


...And more!



### Staying Hydrated With Low-Carb Summertime Beverages

Many common beverages like pop, juices, slushies, and energy drinks are packed with sugars, which can cause a sudden spike in blood sugar levels. Water remains one of the best choices for hydration, but the good news is that there are also many other delicious zero-sugar or low-sugar alternatives that can help you quench your thirst and maintain stable blood sugars throughout the day.

[Read More >](#)



### Which Protein Shake Wins?

Some people find that protein shakes help to do just that, by managing their hunger and helping them to stay on-plan rather than eating off-plan foods when they get busy. We've done the hard work for you by taste testing 10 popular low carb protein shakes and ranking them based on flavor, consistency, and price.

[Read More >](#)



# Future Plans & Motivation

**94%** of patients who currently or intend to follow a low carbohydrate diet also **plan to maintain this diet long term.**

Here are their **top 3 reasons:**

1. *"I want to improve my overall health"*
2. *"I want to improve my A1c"*
3. *"I want to reach my weight loss goal"*

# Updates in LCD Literature

# Literature Updates: Results From a 5-Year VLCD Study



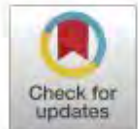
Contents lists available at [ScienceDirect](#)

## Diabetes Research and Clinical Practice

journal homepage: [www.journals.elsevier.com/diabetes-research-and-clinical-practice](http://www.journals.elsevier.com/diabetes-research-and-clinical-practice)

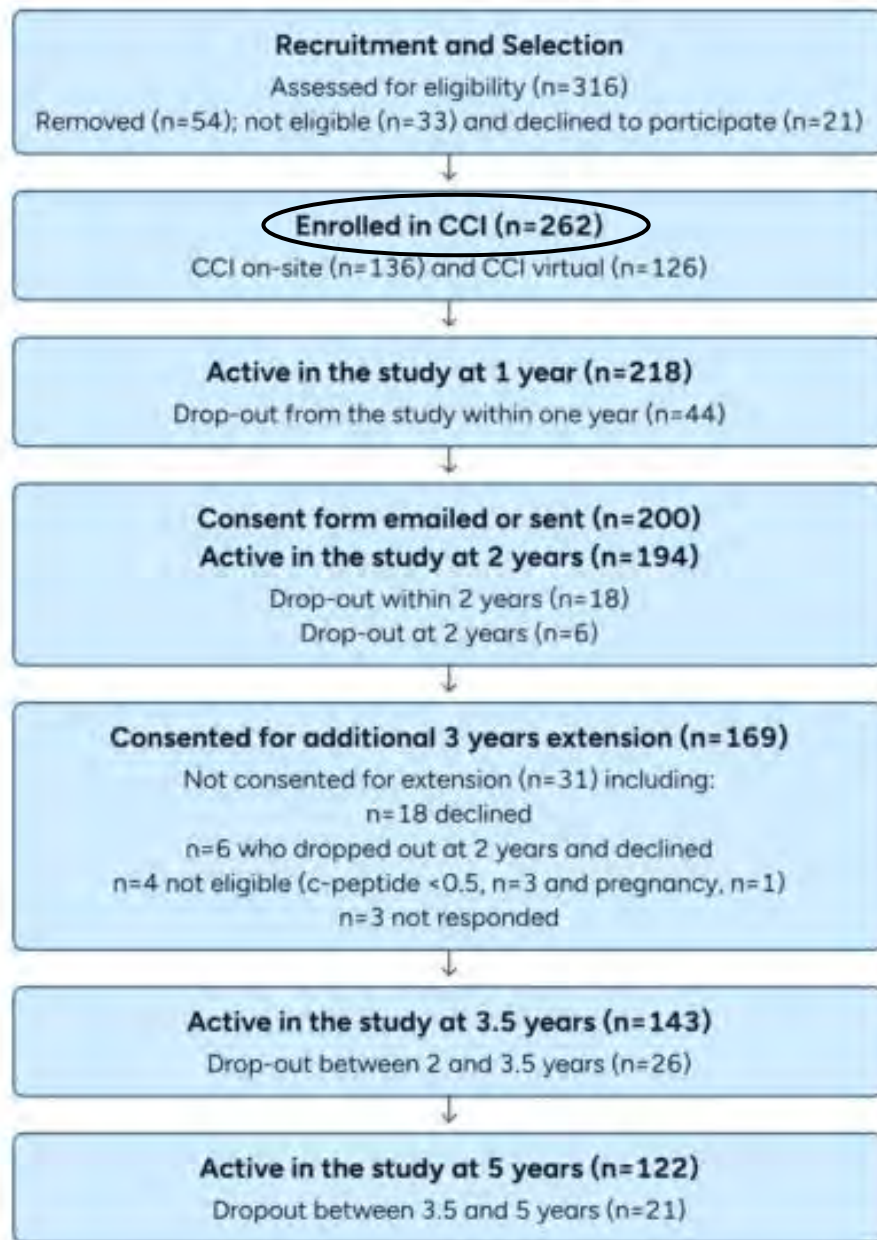


### 5-Year effects of a novel continuous remote care model with carbohydrate-restricted nutrition therapy including nutritional ketosis in type 2 diabetes: An extension study



Amy L. McKenzie<sup>a,1</sup>, Shaminie J. Athinarayanan<sup>b,1,\*</sup>, Michelle R. Van Tieghem<sup>c</sup>,  
Brittanie M. Volk<sup>d</sup>, Caroline G.P. Roberts<sup>b</sup>, Rebecca N. Adams<sup>b</sup>, Jeff S. Volek<sup>e</sup>,  
Stephen D. Phinney<sup>f,2</sup>, Sarah J. Hallberg<sup>b</sup>

# 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**



# Summary of Results

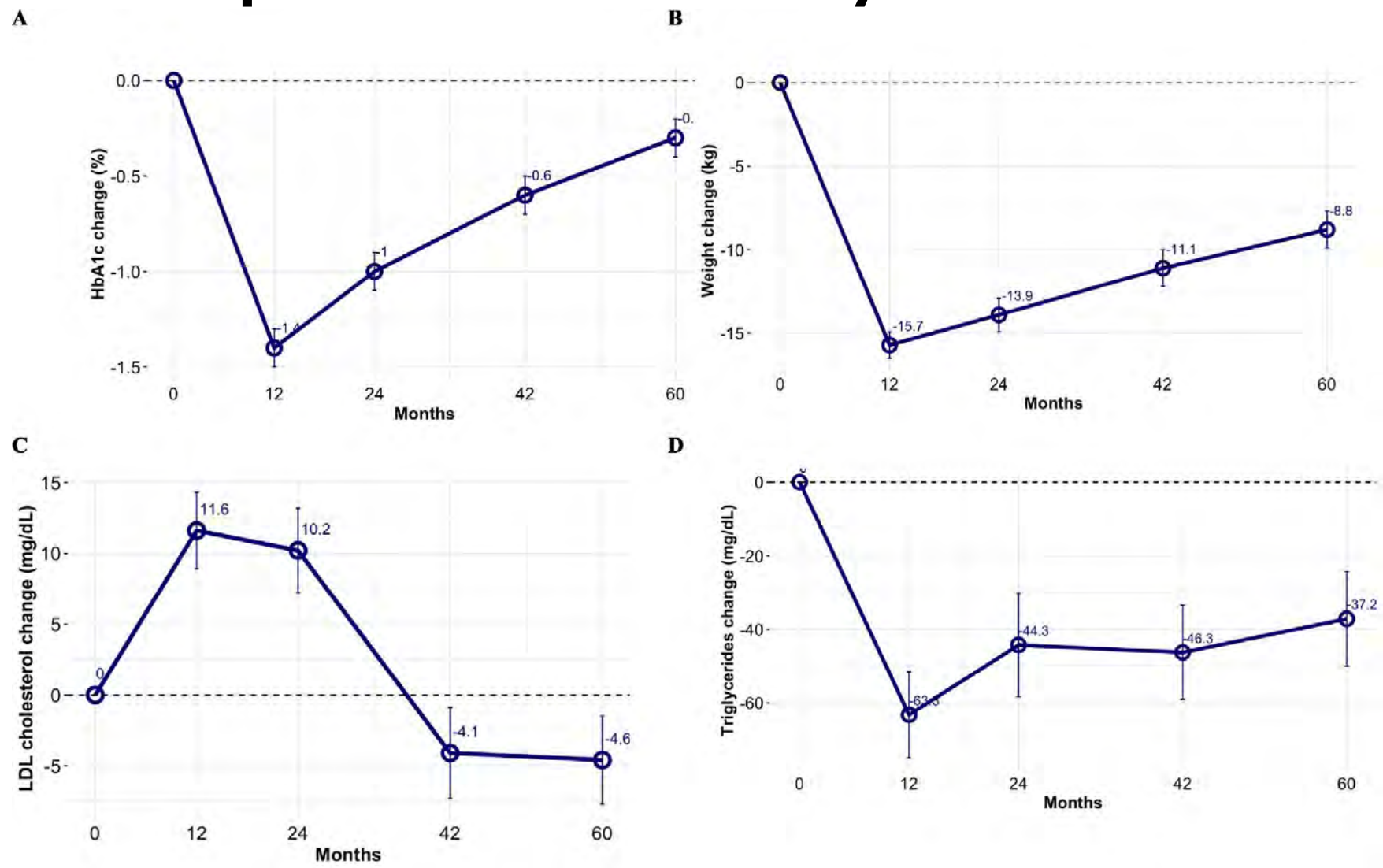
Study assessed 5-year effects of a continuous care telemedicine intervention for people with T2D following a VLCD (n=122).

**20% (n=24)** of 5-yr completers with data (n=120) **achieved diabetes remission** (A1c<6.5%, no glucose-lowering therapy  $\geq$  3mo).

**32.5% (n=39)** achieved **HbA1c <6.5% (only on metformin)**.

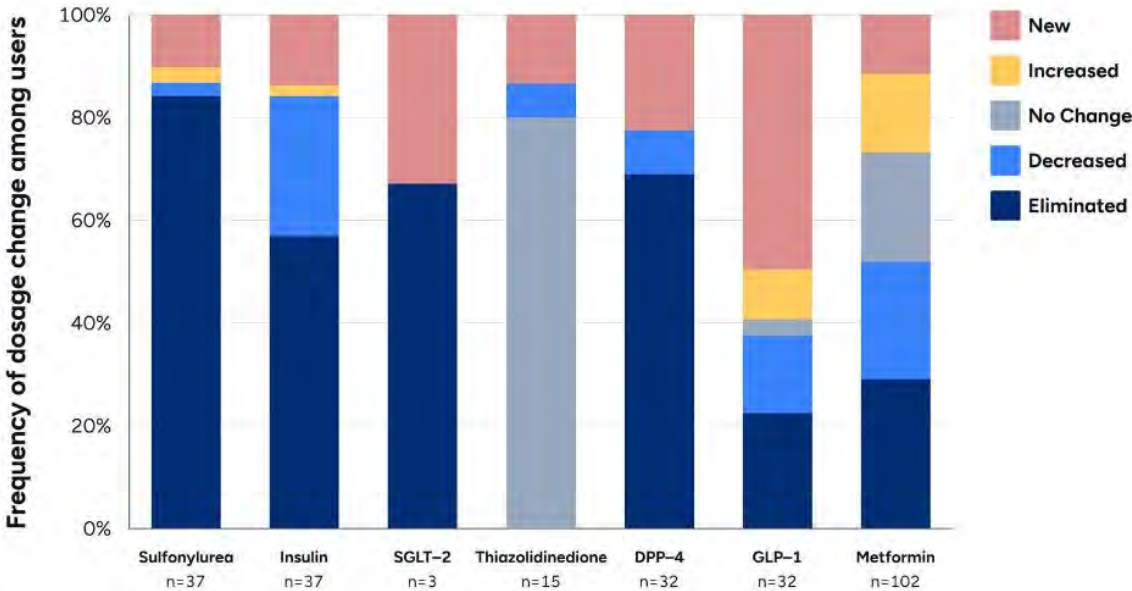
**Sustained improvements** noted in **BMI (-7.6%), HbA1c (-0.3%), TGs (-18.4%), HDL-C (+17.4%), and inflammatory markers**, with **no significant changes in LDL-C and total cholesterol** at 5 years.

# Sustained Improvements in Key Metrics at 5 Years

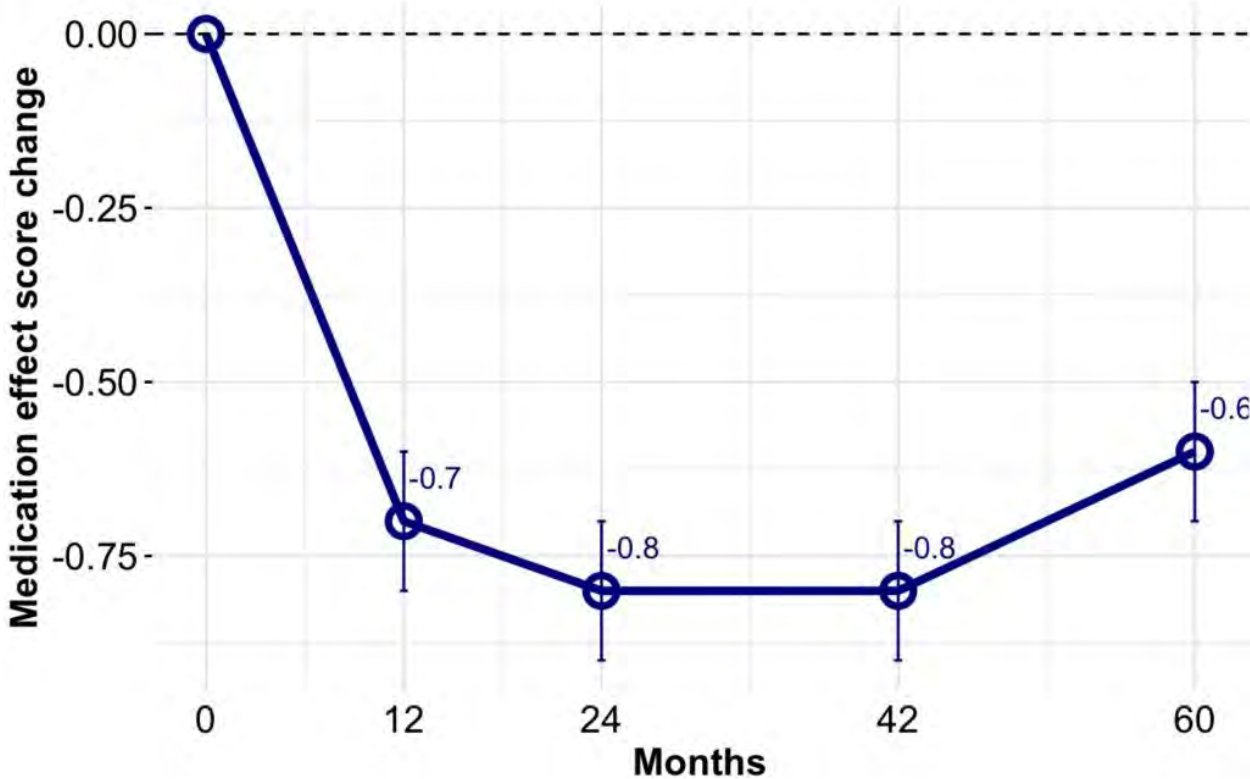


# Significant Reduction in Use of Diabetes Medications at 5 Years

A



B



# Strengths and Limitations

## Strengths:

- Duration of study
- Novel CCI care model
- Broad applicability for populations living with T2D

## Limitations:

- Lack of comparison group through 5 yrs
- Limited racial diversity of study participants
- Data at 5 yr endpoint were collected during COVID-19 pandemic which may have influenced results.



# Authors' Conclusions and Takeaways

1. Significant and sustained reductions in medication need and use, in addition to complete diabetes remission, is possible.
2. 58% of participants sustained remission from two through five years, compared to 26% in the DiRECT study.
3. Markers of CVD risk remained improved compared to baseline, even with some regression over time. Slight increases in LDL-C at one and two years of the intervention regressed back to baseline level at five years despite no significant changes in statin use.

# Pre-Submitted Questions

# Recommendations For Protein and Types of Fats

- ❑ Recommended Dietary Allowance (RDA) for protein
  - ❑ **0.8g/kg body weight** → minimum protein requirement
  - ❑ Dietary Guidelines for Americans recommends 10-30% total energy intake
    - ❑ e.g., 1800 kcal = 90-112 grams/day (20-25%)

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  - ❑ Maintenance of muscle mass
  - ❑ Satiety and appetite control



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- ❑ **75-100 grams of protein/day - my general recommendation**

# Recommendations For Protein and Types of Fats

- ❑ In general, there are no standardized guidelines for calories or fat grams on a low carbohydrate diet.
- ❑ Dietary fats should be used to support meal planning, customize flavor preferences and achieve satiety.

# Recommendations For Protein and Types of Fats

- Recommend fats that occur naturally in food and have been minimally processed including:
  - Monounsaturated fats
    - Olives & olive oil
    - Avocados & avocado oil
    - Almonds, pecans, peanuts, macadamias etc.
  - Polyunsaturated fats
    - Walnuts
    - Chia seeds, flaxseeds, hemp seeds
    - Fatty fish (salmon, mackerel, herring, sardines etc.)
    - Grass-fed meat, eggs, and dairy
    - Algae
  - For cooking/prep
    - Olive oil & avocado oil
    - Butter & ghee

# Lower Carb Alternatives

| Instead of...            | Try these!   |   |   |   |
|--------------------------|--|---|---|---|
| <b>Potatoes</b>          | <p>Replace potatoes in your recipe with a low-carb root vegetable:</p> <ul style="list-style-type: none"> <li>• Jicama</li> <li>• Turnip</li> <li>• Kohlrabi</li> <li>• Rutabaga</li> <li>• Daikon radish</li> </ul>                               | <p>Use a head of cauliflower to make mashed cauliflower. Season with your favorites like garlic, herbs, and cheese!</p>   | <p>Swap French fries with a side of vegetables or spring salad. For a crunchy side vegetable, try sliced carrots, radishes, celery, bell peppers, cucumbers, and jicama</p>   | <p>Make home-style hash by dicing up any one of the lower carb root vegetables and saute with olive oil, onion and garlic. Season to taste with your favorite spices.</p>   |
| <b>Bread &amp; Wraps</b> | <p>Turn any sandwich into a leafy green wrap! You can wrap your fillings with:</p> <ul style="list-style-type: none"> <li>• Iceberg lettuce</li> <li>• Romaine lettuce</li> <li>• Collard greens</li> <li>• Swiss chard</li> <li>• Kale</li> </ul> | <p>Grill 2 portabella mushrooms in place of a burger bun. Enjoy with a patty of choice, cheese and any condiments for an umami-punch!</p>   | <p>Turn your favorite sandwiches or tacos into a 1-bowl meal! Start with a bed of leafy greens or lettuce, and top with your proteins, diced vegetables, and any other condiments like pickles, guac, cheese and salsa.</p> | <p>Find low carb breads and wraps at your local grocery store or bake your own at home using low-carb flours such as almond and coconut flour. We love making egg wraps or protein-rich cottage cheese wraps.</p>             |
| <b>Rice</b>              | <p>Riced cauliflower is an excellent swap for rice. It works well seasoned with fresh herbs, or use it to make your favorite fried rice dish!</p>  | <p>Try quinoa for a high protein and lower carb swap. You can cook your quinoa in bone broth for even more flavor and protein. Jazz it up with fresh herbs, lemon juice, and garlic for extra flavor.</p> | <p>Find low-carb rice options at your local grocery store. Examples include hearts of palm rice and shirataki rice.</p>   | <p>Use whole grains in place of white rice such as cooked farro, oats, barley, and buckwheat to pack in those nutrients and fiber! Mixing edamame or other beans will also add another dimension of flavor and nutrients.</p> |
| <b>Corn</b>              | <p>Swap corn with your favorite non-starchy vegetables like asparagus, green beans, zucchini, broccoli, cauliflower, salads etc.</p>   | <p>Use thinly sliced jicama as your wrap in place of flour or corn tortillas for light and refreshing low-carb tacos.</p>   | <p>Make your own low-carb cornbread using almond or coconut flour in place of wheat flour. Search online for "low carb cornbread recipes."</p>  | <p>Low carb tortilla chips: Slice store-bought low carb tortillas into triangles. Bake them at 350 F until golden brown. Let it cool and enjoy these with your favorite salsa and dip.</p>                                    |





# Thank you!

Questions?