



NF-002

Carbohydrates for Life

The Metabolism-U User Guide to Energy, Metabolic Health, Performance, and Healthy Aging

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Metabolism-U Nutrition Fundamentals Series

Core message: Carbohydrates are not inherently “good” or “bad.” They are a major source of dietary energy and a key fuel for exercise, while carbohydrate-rich foods can also deliver fiber, vitamins, minerals, and phytochemicals. Health effects depend strongly on food quality, amount, total energy intake, activity, and individual metabolic needs.

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Important Medical and AI Disclosures

Medical disclaimer - read before using this guide: This publication is provided for general educational and informational purposes only. It does not provide medical advice, diagnosis, treatment, or an individualized nutrition prescription, and it does not establish a clinician-patient relationship. Do not begin, stop, or materially change a carbohydrate-restricted, ketogenic, high-carbohydrate, weight-loss, diabetes, exercise-fueling, or supplement plan on the basis of this guide alone. Seek guidance from your personal licensed healthcare professional before incorporating this information into your lifestyle.

Carbohydrate needs can change with age, body size and composition, activity, training volume, total energy intake, pregnancy or lactation, diabetes, use of insulin or glucose-lowering medications, gastrointestinal disease, kidney disease, surgery, illness, and other clinical factors. Recommendations for generally healthy adults may be inappropriate for people with medical conditions.

People with diabetes or prediabetes may benefit from individualized carbohydrate planning, but there is no single ideal carbohydrate percentage for everyone with diabetes. Medication regimen, hypoglycemia risk, glucose patterns, food preferences, body-composition goals, and overall diet quality all matter [5].

Consider consulting a qualified sports-nutrition professional when carbohydrate intake is being deliberately manipulated for endurance training, competition, glycogen restoration, or high-volume exercise. When possible, choose a registered dietitian nutritionist with training in sports nutrition or another appropriately licensed or credentialed professional working within scope of practice.

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How to Use This Guide

The Nutrition Fundamentals webpage introduces carbohydrates in a few sentences. This guide is the next layer: enough science to explain what carbohydrates do, how they differ, and how to use them practically within a healthy eating pattern. It is designed primarily for adults over 50 while remaining useful to family members, health professionals, and fitness professionals.

Important distinction: A carbohydrate target is not a moral judgment about food. The same number of carbohydrate grams can come from very different foods and produce very different amounts of fiber, micronutrients, satiety, and overall dietary quality.

What this guide will help you do

- Understand what carbohydrates are and how they are digested, absorbed, stored, and used.
- Separate minimum population reference values from individualized energy and performance targets.
- Recognize the difference between carbohydrate quantity and carbohydrate quality.
- Choose carbohydrate-rich foods that also contribute fiber, micronutrients, and overall dietary quality.
- Understand when glycemic index, meal timing, and exercise fueling may matter.
- Recognize situations in which diabetes, medications, gastrointestinal disease, or intensive training require individualized professional guidance.

What Carbohydrates Do

Carbohydrates include sugars, starches, and fiber. Digestible carbohydrates are broken down largely into monosaccharides, including glucose, which can be absorbed and used for energy. Glucose can be used immediately, stored as glycogen in liver and skeletal muscle, or—when energy intake exceeds needs—contribute indirectly to energy storage. Dietary fiber is structurally carbohydrate but is not digested in the same way; it has important gastrointestinal and metabolic roles that are covered in greater depth in NF-004 Fiber [1,2].

Carbohydrate provides approximately 4 kilocalories per gram. It is especially useful during moderate- to high-intensity exercise because carbohydrate can supply ATP (a form of energy) rapidly and because muscle glycogen is a major fuel for repeated hard efforts [6].

Carbohydrates: Not All the Same

The word carbohydrate describes a large family of compounds. Their health effects cannot be predicted simply by calling them “carbs.” Food structure, fiber, degree of processing, portion size, added sugars, and the rest of the meal all influence digestion, satiety, glucose response, and nutrient value.

Type	Common examples	What happens
Naturally occurring sugars	Fruit, milk, plain yogurt, some vegetables	Sugars occur within a food matrix that may also provide water, fiber, protein, vitamins, minerals, or phytochemicals.
Starches	Oats, rice, potatoes, corn, bread, pasta, beans	Starches are chains of glucose units. Digestion rate varies with food structure, processing, cooking, cooling, and meal composition.
Dietary fiber	Whole grains, legumes, vegetables, fruit, nuts, seeds	Fiber is not fully digested by human enzymes. Some types are fermented by gut microbes; others contribute bulk and stool formation.
Added/free sugars	Table sugar, syrups, sweetened drinks, candies, many desserts	These can add energy with limited satiety or micronutrient value, especially in beverages. WHO recommends limiting free sugars [9].
Refined grain carbohydrates	White bread, many crackers, pastries, refined cereals	Processing removes varying amounts of bran and germ, often reducing fiber and changing texture and digestion rate.

From Food to Fuel

1. Digestion breaks many starches and disaccharides into absorbable monosaccharides.
2. Glucose enters the circulation and is taken up by tissues under the influence of insulin and other regulatory signals.
3. The liver stores glycogen that helps support blood glucose between meals and during exercise.
4. Skeletal muscle stores glycogen locally for muscular work; muscle glycogen is not directly released into the bloodstream.
5. When carbohydrate availability is low, the body can increase use of fat and can synthesize glucose from non-carbohydrate precursors. This metabolic flexibility does not make carbohydrate quality irrelevant.

The practical point: The body is metabolically flexible, but flexibility is not the same as saying all dietary patterns are equivalent for every goal. Training intensity, glucose regulation, appetite, food preferences, and medical conditions can change what carbohydrate pattern works best.

Carbohydrates Across the Body

Carbohydrates are most visible as a source of energy, but carbohydrate-rich foods can contribute much more than calories. Their broader value depends heavily on food choice and dietary pattern.

Whole-body role	Examples	Why it matters
Rapidly available energy	Blood glucose; muscle glycogen	Supports ATP production, particularly during moderate- to high-intensity exercise and repeated hard efforts.
Liver glycogen and glucose regulation	Hepatic glycogen	Helps maintain circulating glucose between meals and during activity.
Muscle performance	Muscle glycogen	Provides a local carbohydrate reserve for training, sport, and physically demanding work.
Brain and nervous system	Glucose as an important fuel	Glucose is a major brain fuel under ordinary mixed-diet conditions; the body can adapt partly to ketone use during prolonged very-low-carbohydrate intake.
Gastrointestinal health	Fiber, resistant starch, fermentable carbohydrates	Supports stool bulk, bowel regularity, and microbial fermentation; some fermentation products influence colonic health and metabolism.
Micronutrient delivery	Fruit, vegetables, legumes, whole grains	High-quality carbohydrate foods can provide potassium, magnesium, folate, B vitamins, vitamin C, carotenoids, and other bioactive compounds.
Cardiometabolic dietary pattern	Whole grains, pulses, fruit, vegetables	Higher-fiber, minimally processed carbohydrate patterns are consistently associated with better long-term health outcomes [2,7].

Unifying idea: Carbohydrate is both a fuel category and a food-quality question. A bowl of lentils, an apple, a sweetened soft drink, and a frosted pastry all contain carbohydrate—but they are not nutritionally interchangeable.

Carbohydrate Quality Matters

For chronic disease prevention, current guidance places strong emphasis on carbohydrate quality. WHO recommends that carbohydrate intake come primarily from whole grains, vegetables, fruits, and pulses, and recommends at least 25 g/day of naturally occurring dietary fiber for adults [2,3]. Large systematic reviews likewise support benefits from higher fiber and whole-grain intake [7].

A practical quality hierarchy

Prefer more often	Use according to context	Limit more often
Vegetables; whole fruit; beans, peas, lentils; minimally processed whole grains; intact starchy vegetables	Refined grains that are fortified/enriched; lower-fiber starches around demanding training; juice in selected situations; sports foods during prolonged exercise	Sugar-sweetened beverages; candies; pastries; heavily refined snack foods; foods where added/free sugars displace nutrient-dense choices

Whole fruit is not the same as fruit juice

Whole fruit retains its cellular structure and usually provides fiber, chewing, and greater satiety. Juice can contribute vitamins and minerals but is easier to consume rapidly and is included in WHO’s definition of free sugars. For most people, whole fruit should do most of the work [3,9].

Whole grains and legumes

Whole grains retain the bran, germ, and endosperm. Legumes provide a distinctive combination of starch, fiber, plant protein, and micronutrients. These foods often produce a more favorable nutritional package than highly refined grain products, even when total carbohydrate grams are similar.

Do not judge a food by carbohydrate grams alone. Ask: How much fiber does it provide? How processed is it? What nutrients come with it? How filling is it? What is the portion? What does it replace in the diet?

How Much Carbohydrate?

Carbohydrate needs can be expressed as grams per day, a percentage of total energy, or—particularly in sports nutrition—grams per kilogram of body weight. These frameworks answer different questions and should not be treated as interchangeable prescriptions.

Context	Common reference or range	Interpretation
Adult RDA	130 g/day	U.S./Canadian DRI reference for most nonpregnant adults, derived in part from estimated brain glucose use. It is not a personalized performance target [1].
Adult AMDR	45–65% of total energy	Population-level macronutrient distribution range from the National Academies; not a requirement that every individual remain within this range [1].
WHO healthy-diet guidance	Approximately 45–75% of energy for most people	Current WHO framing emphasizes unrefined sources and carbohydrate quality [3].
Pregnancy	175 g/day RDA	Life-stage DRI; individualized care may be needed, especially with diabetes or gastrointestinal issues [1]. Seek specific advice from your medical provider.
Lactation	210 g/day RDA	Life-stage DRI; energy needs and feeding pattern also matter [1]. Seek specific advice from your medical provider.
Diabetes/prediabetes	No single ideal percentage	ADA recommends individualized meal plans based on nutrient quality, total calories, preferences, medications, and metabolic goals [5]. Seek specific advice from your medical provider.

Important: 130 g/day is a reference intake, not a universal “minimum for health” in every circumstance and not an athletic target. People can consume less carbohydrate under clinical or dietary supervision, while highly active people may need far more.

The most useful question is often not “What percentage of my calories should be carbohydrate?” but “What amount and type of carbohydrate supports my health, energy needs, glucose control, appetite, training, and total dietary quality?”

Carbohydrate for Active and Highly Active Adults

Sports-nutrition guidance scales carbohydrate to training load because glycogen demand rises with duration and intensity. These are athlete-planning ranges, not requirements for every older adult or recreational exerciser [6].

Training demand	Sports-nutrition planning range	Practical meaning
Light / skill-based activity	3–5 g/kg/day	Often compatible with a normal mixed diet; total energy and food quality still matter.
Moderate training (~1 h/day)	5–7 g/kg/day	May support regular moderate training and glycogen restoration.
Endurance / high training (1–3 h/day)	6–10 g/kg/day	Designed for substantial glycogen demand; commonly exceeds general-population intakes.
Very high training (>4–5 h/day)	8–12 g/kg/day	Specialized endurance range requiring deliberate planning and gastrointestinal tolerance.

For resistance training, power training, boxing, hiking, and mixed fitness, the best target depends on session volume, intensity, frequency, body-composition goals, and how the individual performs. A recreationally active person does not automatically need an endurance-athlete carbohydrate intake.

Active older adults: Carbohydrate can support training quality and recovery, but high intake is not automatically better. Match carbohydrate availability to the work you are asking the body to perform, while preserving protein adequacy, healthy fats, fiber, and total nutrient density.

When training volume changes across a week or season, carbohydrate intake can also change. This “fuel for the work required” approach is often more practical than forcing the same carbohydrate target every day [6].

Glycemic Index, Glycemic Load, and Glucose Response

The glycemic index (GI) ranks carbohydrate-containing foods by how strongly a fixed amount of available carbohydrate raises blood glucose compared with a reference food. Glycemic load (GL) combines GI with the amount of available carbohydrate in a usual serving. These tools can be useful, but they are not complete measures of food quality.

Concept	What it tells you	What it does not tell you
Glycemic index	Relative glucose response to a standardized amount of available carbohydrate	Typical portion size, fiber quantity, micronutrients, calories, or overall diet quality.
Glycemic load	Approximate glucose impact accounting for both GI and carbohydrate amount	Individual glucose response, medication effects, mixed-meal interactions, or long-term health by itself.
Continuous glucose response	Your personal glucose pattern after a specific meal	Whether a food is globally “healthy” or “unhealthy,” or whether short-term glucose excursions alone determine long-term outcomes.

Cooking, food processing, ripeness, particle size, cooling and reheating, meal composition, preceding exercise, sleep, stress, and individual physiology can all change glucose response. Adding protein, fat, fiber, or acidity can alter the rate of absorption without changing the total carbohydrate grams.

In people with diabetes, randomized-trial evidence suggests that lower-GI/GL dietary patterns can produce modest improvements in HbA1c and several cardiometabolic risk factors compared with higher-GI/GL patterns [8].

Use GI as a tool—not a verdict. A nutritious food can have a moderate or high GI, and a low-GI food can still be calorie-dense or nutrient-poor. Food quality and overall dietary pattern remain primary. Consider discussing your own GI with your personal health care provider.

Carbohydrate Timing Around Exercise

Total daily energy and carbohydrate intake usually matter more than chasing a narrow timing window. Timing becomes more important when training is prolonged, intense, repeated, or separated by short recovery periods [6].

Before exercise

A carbohydrate-containing meal or snack before demanding exercise can improve carbohydrate availability, especially when liver glycogen is lower after an overnight fast or when the session is prolonged. The amount and timing should reflect gastrointestinal tolerance, meal size, and exercise intensity.

During exercise

Carbohydrate intake during prolonged endurance activity can help maintain blood glucose, preserve carbohydrate availability, and delay fatigue. The need is much lower for brief or easy sessions. Specialized fueling strategies should be practiced in training rather than introduced for the first time on competition day [6]. Adding carbohydrates during exercise is usually more beneficial during endurance type activities – Think running a marathon or and 10 K run.

After exercise

Carbohydrate helps restore glycogen. Rapid refueling matters most when another demanding session will occur within hours; otherwise, a normal carbohydrate-containing meal pattern usually provides more time for restoration. Protein should also be adequate for recovery and adaptation. Personally, I avoided post exercise carbs for years. Recently, however, I started adding a small, 30-50 g source of rapidly absorbable fast carb, immediately after my training, and boy has it helped me. I feel more energetic and I am physically developing much faster.

Situation	Practical emphasis
Easy walk / light activity	No special carbohydrate timing is usually needed beyond a balanced diet.
Resistance or mixed training	A normal meal pattern with adequate daily carbohydrate often works well; add strategic carbohydrate if training quality suffers or volume is high.
Long endurance session	Carbohydrate before and, when appropriate, during exercise becomes more relevant.
Two hard sessions in one day	Earlier and more deliberate carbohydrate replacement can become important.
Weight-loss phase	Balance training fuel against calorie targets; avoid under-fueling hard sessions simply to force a lower carbohydrate number.

Carbohydrate Food Choice

The table below illustrates common carbohydrate-containing foods. Values are approximate and vary by brand, preparation, ripeness, and serving size. The goal is not to memorize numbers; it is to recognize which foods deliver carbohydrate together with fiber and micronutrients.

Food	Typical portion	Approx. carbohydrate	Quality notes
Oatmeal, cooked	1 cup	~28 g	Whole grain; provides soluble fiber.
Brown rice, cooked	1 cup	~45 g	Whole grain; portion size meaningfully affects total load.
Quinoa, cooked	1 cup	~39 g	Whole-grain-like seed; also provides protein and minerals.
Lentils, cooked	1 cup	~40 g	High fiber; also substantial plant protein.
Black beans, cooked	1 cup	~40 g	High fiber; resistant starch and plant protein.
Potato, baked, medium	1 medium	~37 g	Potassium-rich starchy vegetable; preparation and toppings matter.
Banana, medium	1	~27 g	Whole fruit with potassium and fiber.
Berries	1 cup	~15–20 g	Whole fruit; generally high nutrient density and fiber.
Milk	1 cup	~12 g	Naturally occurring lactose plus protein and calcium.
Whole-grain bread	2 slices	~24–30 g	Check label for whole-grain content and fiber.
Sugar-sweetened soda	12 fl oz	~35–40 g	Mostly free/added sugar; low satiety and minimal nutrient value.

Approximate values are based on typical USDA FoodData Central entries and common product labels. Verify the specific label or database entry when precision matters [10].

Food-first principle: Most carbohydrate should come from foods that do more than supply carbohydrate—vegetables, fruits, legumes, whole grains, and minimally processed starches. Sports drinks, gels, and refined carbohydrate foods are tools for specific performance situations, not default health foods.

Carbohydrates in Common Real-World Situations

During weight loss

Weight loss depends on sustained energy balance, not simply eliminating carbohydrate. Lower-carbohydrate patterns can help some people control appetite or simplify food choices, while others do well with moderate or higher carbohydrate intake built around minimally processed foods. Protect protein, resistance training, fiber, and micronutrient intake while creating a sustainable calorie deficit.

With prediabetes or type 2 diabetes

ADA 2026 guidance emphasizes individualized meal plans. Reducing carbohydrate intake can improve glycemia for some adults, but there is no single ideal carbohydrate percentage. High-fiber, minimally processed carbohydrate sources remain important, and medication use can materially affect what is safe [5].

With insulin or insulin secretagogues

Changes in carbohydrate amount or timing can change hypoglycemia risk. People using fixed insulin doses may benefit from more consistent carbohydrate timing and amount, while people using flexible mealtime insulin may use carbohydrate counting. These decisions require individualized diabetes education and clinical guidance [5].

During illness, surgery, or rehabilitation

Appetite, glucose regulation, energy expenditure, mobility, and medication use may all change. The priority is adequate overall nutrition and a plan coordinated with the medical team rather than adherence to a rigid macronutrient ideology.

With gastrointestinal symptoms

Fiber amount, fermentable carbohydrates, lactose, meal size, and food texture can influence symptoms. Restriction should target the specific problem rather than broadly eliminating carbohydrate without a diagnosis.

Medical review: Seek individualized guidance before major carbohydrate restriction when diabetes medications, pregnancy, significant kidney or liver disease, eating-disorder history, unexplained weight loss, malnutrition risk, or major illness or surgery is present.

Common Carbohydrate Mistakes

- Treating all carbohydrate as sugar: Lentils, oats, berries, milk, soda, and candy do not have equivalent nutritional effects.
- Assuming “low carb” automatically means healthy: A low-carbohydrate pattern can still be high in saturated fat, low in fiber, or nutritionally narrow.
- Assuming “high carb” automatically means healthy: Refined grains, sweetened drinks, and desserts can produce a high-carbohydrate pattern with poor diet quality.
- Focusing only on glucose spikes: A single glucose excursion does not fully capture food quality, calories, fiber, micronutrients, or long-term health effects.
- Under-fueling hard training: Chronically insufficient carbohydrate can reduce training quality for some people when volume and intensity are high.
- Using sports foods as everyday foods: Gels and sports drinks are useful tools in selected exercise settings but are usually unnecessary for routine sedentary life.
- Cutting fruit, beans, or whole grains before cutting sugary drinks and highly refined snacks: The order of changes matters.

The Metabolism-U Carbohydrate Action Plan

1. Estimate your current intake from several typical days rather than one “perfect” day.
2. Identify where your carbohydrate comes from: whole/minimally processed foods versus refined grains, sweets, and sweetened drinks.
3. Set a target that fits health, energy needs, glucose regulation, training load, and body-composition goals.
4. Build most carbohydrate around vegetables, whole fruit, legumes, whole grains, and minimally processed starches.
5. Match carbohydrate availability to demanding exercise rather than using a fixed number regardless of training.
6. Protect fiber, protein, healthy fats, and micronutrient adequacy when changing carbohydrate intake.
7. Reassess during weight loss, illness, medication changes, surgery, or major changes in training volume.
8. Seek professional guidance when carbohydrate changes interact with diabetes treatment or other medical conditions.

One-Day Carbohydrate Pattern: An Illustration

This example demonstrates food quality and distribution; it is not a universal meal plan. Portions should be adjusted for energy needs, glucose goals, preferences, allergies, medical conditions, and training.

Eating occasion	Example	Approx. carbohydrate
Breakfast	Oatmeal with Greek yogurt, berries, and walnuts	~45–55 g
Lunch	Large salad with lentils or beans, vegetables, and whole-grain pita	~45–60 g
Snack	Apple with peanut butter, or plain yogurt with fruit	~20–30 g
Dinner	Fish or tofu with roasted vegetables and potato or brown rice	~45–60 g

Key Takeaways

- Carbohydrate is a major dietary fuel and becomes especially important as exercise intensity and duration rise.
- Carbohydrate quality matters at least as much as carbohydrate quantity for long-term health.
- Whole grains, vegetables, fruits, and pulses should provide most carbohydrate in a healthy dietary pattern [2,3].
- The adult RDA of 130 g/day and AMDR of 45–65% of energy are population reference values, not personalized performance targets [1].
- People with diabetes do not have one universally correct carbohydrate percentage; individualized planning is recommended [5].
- Lower-carbohydrate and higher-carbohydrate eating patterns can both be constructed well or poorly. Overall food quality, energy balance, fiber, and sustainability matter.
- High-volume endurance athletes may need carbohydrate intakes far above general-population levels; recreational exercisers usually do not [6].
- Free sugars and sugar-sweetened beverages should be limited; whole fruit should generally be favored over juice [3,9].

Above all: Build a carbohydrate pattern that supports the life you want to live—your metabolic health, your training, your energy, and your long-term ability to function independently.

Evidence Notes and References

The numerical, comparative, and clinical statements in this guide were reviewed against authoritative dietary reference material, current public-health guidance, professional standards, and peer-reviewed systematic reviews. Bracketed numbers in the text correspond to the sources below. Evidence and guidelines evolve; recommendations should be revisited as newer guidance becomes available.

1. Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. National Academies Press; 2005. doi:10.17226/10490.
2. World Health Organization. Carbohydrate intake for adults and children: WHO guideline. Geneva: WHO; 2023. ISBN 978-92-4-007359-3.
3. World Health Organization. Healthy diet. Updated 2026. WHO fact sheet. Carbohydrate guidance emphasizes whole grains, vegetables, fruits, pulses, and at least 25 g/day naturally occurring dietary fiber for adults.
4. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2025-2030. Current U.S. federal dietary guidance; 2026.
5. American Diabetes Association Professional Practice Committee. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: Standards of Care in Diabetes—2026. Diabetes Care. 2026;49(Suppl 1). doi:10.2337/dc26-S005.
6. Thomas DT, Erdman KA, Burke LM. Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. J Acad Nutr Diet. 2016;116(3):501-528. doi:10.1016/j.jand.2015.12.006. PMID:26920240.
7. Reynolds A, Mann J, Cummings J, et al. Carbohydrate quality and human health: a series of systematic reviews and meta-analyses. Lancet. 2019;393(10170):434-445. doi:10.1016/S0140-6736(18)31809-9. PMID:30638909.
8. Chiavaroli L, Lee D, Ahmed A, et al. Effect of low glycaemic index or load dietary patterns on glycaemic control and cardiometabolic risk factors in diabetes: systematic review and meta-analysis of randomized controlled trials. BMJ. 2021;374:n1651. doi:10.1136/bmj.n1651.
9. World Health Organization. Guideline: Sugars intake for adults and children. Geneva: WHO; 2015. WHO recommends free sugars <10% of total energy and suggests <5% for additional benefit.
10. U.S. Department of Agriculture, Agricultural Research Service. FoodData Central. <https://fdc.nal.usda.gov/>. Accessed September 2026.
11. Murray B, Rosenbloom C. Fundamentals of glycogen metabolism for coaches and athletes. Nutr Rev. 2018;76(4):243-259. doi:10.1093/nutrit/nuy001.
12. American College of Sports Medicine. Nutrition and Athletic Performance Joint Position Statement. Current ACSM position-stand listing accessed 2026; update process announced in 2026.

Final Medical and AI Disclosures

Educational use only: This guide provides general educational information. It is not medical advice and is not a substitute for individualized evaluation, diagnosis, treatment, or nutrition counseling. Seek guidance from your personal licensed healthcare professional before incorporating any recommendation, carbohydrate target, dietary pattern, supplement, or training-related fueling strategy from this publication into your lifestyle.

Carbohydrate intake can be adjusted across a wide range, but suitability depends on individual health, glucose regulation, medications, energy needs, gastrointestinal tolerance, body composition, activity, training, and goals. People with diabetes, especially those using insulin, sulfonylureas, or other medications that can cause hypoglycemia, should obtain individualized guidance before making major carbohydrate changes.

Very-low-carbohydrate or ketogenic eating patterns can be clinically appropriate in selected circumstances but are not necessary for general health and are not suitable for everyone. Conversely, high-carbohydrate sports-nutrition ranges are designed for substantial training demands and should not be generalized to sedentary or lightly active adults.

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