

Curious About Keto?

Some considerations for
nutrition and pump therapy

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Rate your competence and experience in supporting patients who are following a low carbohydrate, high fat diet.

Keto? Hello no, we won't go! Not interested, not doing it. **A**

I've done some preliminary research and reading; though not a lot of demand in my practice **B**

I have a few clients in my practice that follow this and I know enough to help support their basic needs **C**

This is a huge area of interest for me and/or this is part of my daily practice **D**

Snapshot

- Why low carb?
- Carb recommendations (Health Canada, CDA, ADA)
- Types of low carb diets
- Side effects
- Practice considerations (side effects, insulin, etc.)
- Summary & discussion

Diet tip:



Nibble on a cookie about an hour before lunch.

Sugar keeps your energy
up—and your
appetite down.

Willpower fans, the search is over!
And guess where it's at? In sugar!
Sugar works faster than any other
food to turn your appetite down,
turn energy up.

Spoil your appetite with sugar,
and you could come up with

willpower—the willpower you need
to eat less, and maybe even
weigh less.

*Sugar . . . only 18 calories per
teaspoon, and it's all energy.*



Sugar Information

General Post Office Box 94, New York, N. Y. 10001

Don't
blame
the butter
for what
the bread
did!

WWW.MINEBEDSTELCHFOPSKRIFTER.DK

Why Low Carb? Comments from the Experts:

Better BG control

Effort → diet
burden vs CHO
burden

↓ diabetes
frustration and
feelings of failure

↓ insulin needs,
often by 25-60%



↓ risk of hypo

↓ risk of severe
insulin dose
mistakes

What does Health Canada and Diabetes Canada recommend as a minimum daily intake of carbohydrate?

50g per day

90g per day

130g per day

200g per day

Adult Recommendations

	Carb % of Energy	Protein % of Energy	Fat % of Energy	Comments
Health Canada	45-65%	10-35%	20-35%	
Diabetes Canada (grade D consensus)	45-60%	15-20%	20-35%	Macronutrient distribution is flexible <i>within</i> recommended range
American Diabetes Association	Not specified			May be adjusted to meet metabolic goals and individual preferences

Diabetes Recommendations

Diabetes Canada

- 130g/day carb minimum
- Suggest **not** consuming <45% energy daily from carb
 - Vitamins, minerals, fibre
 - To ↓ intake of fat
- May consume up to 60% of energy from carb from low GI and high fibre foods
 - Improvements with glycemic control
 - Lipid improvements (type 2)

American Diabetes Assoc.

...the RDA for digestible carb is 130 g/day... based on providing adequate glucose as required fuel for CNS without reliance on glucose production from ingested protein or fat. Although brain fuel needs can be met on lower-carb diets, long-term metabolic effects of very-low-carb diets are unclear, and such diets eliminate many foods that are important sources of energy, fiber, vitamins, and minerals and that are important in dietary palatability”

Recommendations

Why 130g daily?

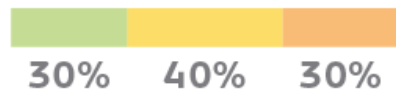
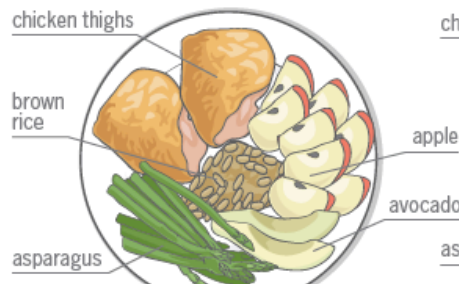
All are referencing the 2002 Institute of Medicine DRI guidelines.

The minimal amount of carbohydrate required, either from endogenous or exogenous sources, is determined by the brain's requirement for glucose.

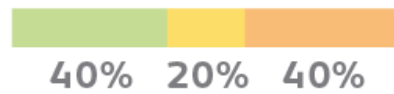
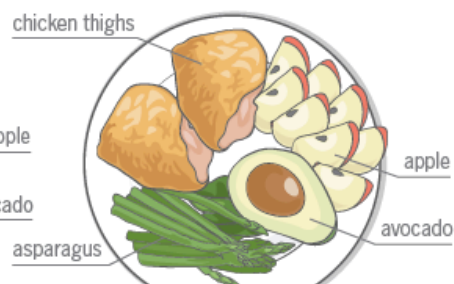
- 130g recommended as the amount body needs in order to **avoid use of** endogenous sources
- Body can adapt with ketosis

THE KETOGENIC DIET COMPARED TO THREE OTHER EATING PLANS

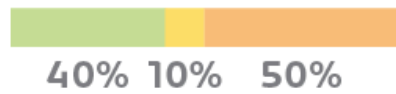
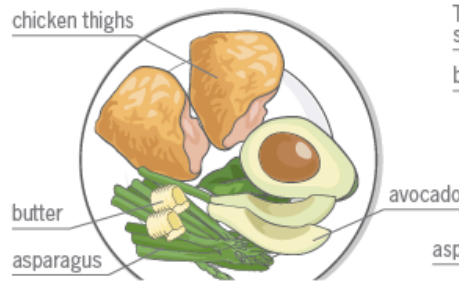
PN MIXED MEAL



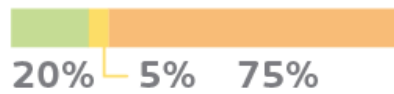
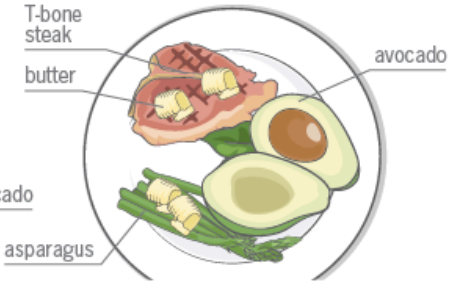
PALEO MEAL



LOW-CARB MEAL



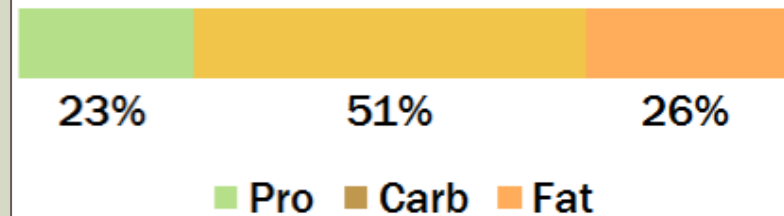
KETOGENIC MEAL



● PROTEIN ● CARB ● FAT

Macronutrient Distribution Comparison

Just the Basics Breakdown (Small Appetite)



For more about the ketogenic diet, including the pros and the cons: www.precisionnutrition.com/ketogenic-diet



LOW CARB FOODS WHAT TO EAT?

YES

MEAT

Eat Grass-fed, Wild Meat & Fish for Omega 3s

Bacon (beware of preservatives)

- Beef
- Beef Jerky
- Bison
- Chicken
- Duck
- Goat
- Organ Meats
- Pork
- Poultry
- Rabbit
- Steak
- Turkey

FISH

Choose Oily Fish when possible & fresh over canned

- Cod
- Crab
- Halibut
- Lobster
- Mackerel
- Mussels
- Oysters
- Plaice
- Salmon
- Sardines
- Scallops
- Shrimp
- Trout
- Tuna

NUTS

- Almonds
- Brazil Nuts

DRINKS

- Coffee
- All Teas (Without added sugar or milk)
- Broth
- Broth
- Lemon & Lime Juice
- Water

FLOUR

- Almond Flour
- Coconut Flour
- Psidium Husk

VEGETABLES

Non starchy vegetables above the ground is best

- All Green Leafy Vegetables
- Artichokes
- Leeks
- Lettuce (All Varieties)
- Mushrooms

NO

ALCOHOL

- Beer
- Cider
- Sweet Liqueurs

SWEETS & SNACKS

- Agave
- Artificial Sweeteners
- Biscuits
- Cakes
- Chocolate
- Cookies
- Crisps
- Donuts
- Dried Fruit
- Energy Drinks
- Fruit Juices
- Ice Cream
- Pancakes
- Pastries
- Syrups
- Sweet Puddings
- Sugary Soft Drinks
- Vegetable Juices

GRAINS & STARCHES

- Barley
- Bread
- Breakfast Cereals
- Buckwheat
- Bulgur
- Wheat
- Chickpeas
- Corn
- Couscous
- Crackers
- Dried Beans
- Lentils
- Legumes
- Millet
- Muesli
- Oats
- Pasta
- Peas
- Pies
- Pizza
- Potatoes
- Quinoa
- Rice
- Rye
- Wheat Flour
- Whole
- Wheat Flour

MEAT

Avoid factory farmed Meat & Fish high in omega 6

Processed Meats Lunch Meats

FATS

- Canola Oil
- Cottonseed Oil
- Corn Oil
- Flaxseed Oil
- Hemp Oil
- Grapeseed Oil
- Margarine
- Safflower Oil
- Soybean Oil
- Sunflower Oil



OCCASIONALLY

Ideally avoid alcohol completely for a healthy lifestyle or weight loss

ALCOHOL

- Brandy
- Dry Red or White Wine
- Gin
- Rum
- Tequila
- Vodka
- Whiskey

DAIRY

- Butter
- Heavy Cream
- Full Fat

NUTS & SEEDS, BERRIES



SWEETS & SNACKS



RAW FULL-FAT DAIRY



NIGHTSHADES & VEGETABLES LOW IN CARBS



HERBS & SPICES

LEAN MEAT & FISH



HEALTHY FATS & OILS

FATTY FISH & MEAT, ORGAN MEATS & EGGS

Avoid low-fat & fat-free products since the healthy fats are removed & loaded with extra sugars & starches

If your weight loss has stalled then cut back on all sugars & increase your veggies & healthy fat intake

lowcarbalpha.com

Drink



WATER



TEA



COFFEE



DRY WINE



SPIRITS



Avoid



An Online Intervention Comparing a Very Low-Carbohydrate Keto Diet and Lifestyle Recommendations Versus a Plate Method Diet Overweight Individuals With Type 2 Diabetes: A Randomized Control Trial

Reversal of Diabetic Nephropathy by a Ketogenic Diet

[Michal M. Poplawski](#)¹, [Jason W. Mastaitis](#)², [Fumiko Isoda](#)¹, [Fabrizio Grosjean](#)³, [Feng Zheng](#)³, and [Charles V. Mobbs](#)^{1,*}

Krisztian Stadler, Editor

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PMCID: PMC3826507

Beyond weight loss: a review of the therapeutic uses of very-low-carbohydrate (ketogenic) diets

[A Paoli](#)^{1,*}, [A Rubini](#)¹, [J S Volek](#)², and [K A Grimaldi](#)³



Nutrients. 2017 May; 9(5): 517.
Published online 2017 May 19. doi: [10.3390/nu9050517](https://doi.org/10.3390/nu9050517)

PMCID: PMC5452247

Effects of Ketogenic Diets on Cardiovascular Risk Factors: Evidence from Animal and Human Studies

[Christophe Kosinski](#)¹ and [François R. Jornayvaz](#)^{2,*}

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Abstract

The treatment of obesity and cardiovascular diseases is one of the most difficult and important challenges nowadays. Weight loss is frequently offered as a therapy and is aimed at improving some of the components of the metabolic syndrome. Among various diets, ketogenic diets, which are very low in carbohydrates and usually high in fats and/or proteins, have gained in popularity. Results regarding the impact of such diets on cardiovascular risk factors are controversial, both in animals and humans, but so

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Long-term effects of a ketogenic diet in obese patients

[Hussein M Dashti](#), MD PhD FICS FACS,¹ [Thazhumpal C Mathew](#), MSc PhD FRCPath,⁴ [Talib Hussein](#), MB ChB,⁵ [Sami K Asfar](#), MB ChB MD FRCSEd FACS,¹ [Abdulla Behbahani](#), MB ChB FRCS FACS PhD FICS FACS,¹ [Mousa A Khoursheed](#), MB ChB FRCS FICS,¹ [Hilal M Al-Sayer](#), MD PhD FICS FACS,¹ [Yousef Y Bo-Abbas](#), MD FRCPC,² and [Naji S Al-Zaid](#), BSc PhD³

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Abstract

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BACKGROUND:

...es have examined the short-term effects of a ketogenic diet in reducing weight in ...-term effects on various physical and biochemical parameters are not known.

...s of a 24-week ketogenic diet (consisting of 30 g carbohydrate, 1 g/kg body weight fat, and 80% polyunsaturated and monounsaturated fat) in obese patients.

Ketogenic diet in endocrine disorders: Current perspectives

[L Gupta](#), [D Khandelwal](#)¹, [S Kalra](#)², [P Gupta](#)³, [D Dutta](#)⁴, and [S Aggarwal](#)⁵

Systematic review and meta-analysis of dietary carbohydrate restriction in patients with type 2 diabetes

A low-carbohydrate, ketogenic diet to treat type 2 diabetes

[William S Yancy, Jr.](#)^{1,2}, [Marjorie Foy](#)¹, [Allison M Chalecki](#)¹, [Mary C Vernon](#)³, and [Eric C Westman](#)²

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Potential Negative Side Effects

Hypoglycemia

Kidney stones

Constipation*

Dehydration

Vitamin and mineral deficiency

↑LDL, but ↓other CV risk factors

Cardiomyopathy (?long QT wave)

Bad breath

Poor growth

Keto flu

Hair loss

Gout

Type 1 on Insulin Pump - Late 30s

- Main motivation - weight loss
- Keto not sustainable, now doing low carb (50g/day)
- Better sites
- BG changes more gradually
 - Not feeling low/treating in 4's and 5's
 - Lows do not feel as intense
 - Highs aren't as high
- Ketones
- Social

This patient had approached you about doing a low carb diet (~50g carb/day). After discussing the risks and benefits of same, this person still wants to follow through.

What do you do with ICR?

Eliminate bolus all together. She isn't going to be eating carbs anyway **A**

Bolus for any/all carb, regardless of how small **B**

Start using protein/fat units (FPU) **C**

Use modified bolus features **D**

Adjust ratio to be less aggressive **E**

What do you do with the basal?

Pump Considerations: Basal & Bolus

Basal

- Decrease basal depending on current glycemic control
 - Type 2: ↓ by 50% if currently at target
 - Type 1:

Bolus

- Decrease basal based on carbohydrate
- Use of correction scale (? Δ ISF)
- Consider FPU and/or modified bolus

Adverse Events: Lows and DKA

Prevention of lows

- Temp basal for ↑ activity
- Effects of alcohol (temp basals, more checks)

Treatment

- Hesitation to treat lows normally?
- Glucagon: reduced treatment effect (mild hypoglycemia)

DKA

- ? concern vs reality
- Less insulin on board → shorter time to DKA?

Insulin Change for Type 2 on MDI

Then

- NPH: 21@B, 32@HS
- Novorapid: 12@B and 14@s
- Metformin: 1000mg BID
- 3 BP meds
- Feeling hopeless with highs and lows, high diabetes distress

During Transition

- Day 1: dc Novorapid, ↓ NPH by 50%
- Day 2-8: gradual ↓ of NPH based on BG
- Day 9-: no insulin

Now

- ½ dose of 1 med for BP

The More We Read, the More Questions We Have

Considerations

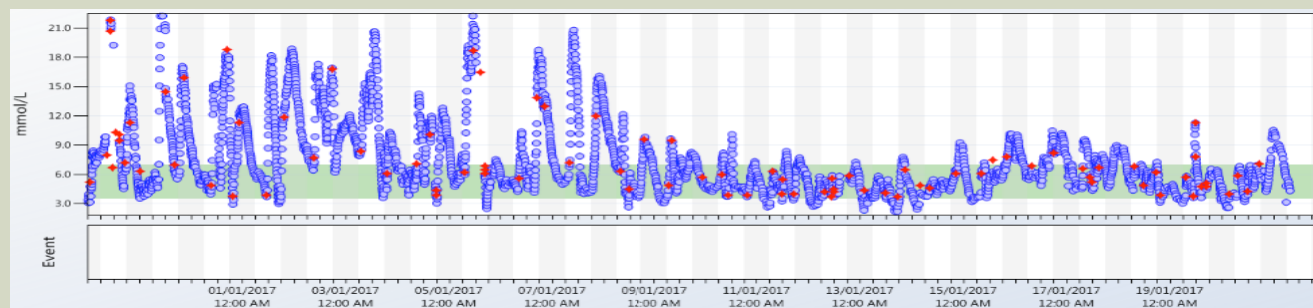
- Non insulin agents
- BP meds
- Na (<50g CHO)
- Hydration
- QoL
 - Compliance
 - Social & family
 - Cost
 - Time & adjustment
- Sustainability

Questions

- DKA in T1
- Warfarin
- Restrictive eating → ? ED
- Supplementation: Mg, K
- ++Na → ? CVD
- Fat:Pro:Carb
- ? beneficial gastroparesis
- Whipple → ? Δ enzymes

Type 1 on injections - 10 years old

- Driver - better BG control
- Low carb (50g/day)
- Initial concerns
 - Brain development, poor growth, poor energy
- Insulin doses markedly decreased
- A1C around 6%
- Ketones
- Whole family follows
- Special occasions
- Low treatment ½ to 1 dex tab



Summary Points

- Optional therapy for some individuals (benefit>burden)
- Potential to improve various health markers
- Must be done with appropriate medical monitoring & management
- Open mind from health care team to provide support

Questions & Discussion

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Thank You

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