Prediabetes & type 2 diabetes:

Your patient toolkit

You may have been told that diabetes is an irreversible, progressive condition. However, our knowledge of diabetes has changed dramatically in recent years. Evidence from clinical experience and scientific studies shows you may be able to stop the progression of prediabetes and even reverse type 2 diabetes.

What are your preferences?

Tell your clinician you want to:

1) Try to *reverse* or *place into remission*, prediabetes and type 2 diabetes. This means avoiding or reducing medication if possible, while still having safe blood sugar levels.
2) Use diet and lifestyle - instead of medication - to keep your blood sugar levels in a healthy range.

What is the best way to eat to improve diabetes?

Diabetes organizations agree: Reducing overall carbohydrate intake has *the most evidence* for keeping blood sugar at a healthy level. If you can reduce sugar, sugary drinks, and packaged sugary and starchy foods, you can probably reduce your blood sugar.

If you are currently taking medications to lower blood sugar, your healthcare provider should make a plan with you to adjust these medications when you change your diet.

Diabetes medications (except metformin) can make your blood sugar go too low if they are not adjusted when you begin to eat fewer sugary and starchy foods.

Do I have to lose weight?

If you are overweight or obese, you may have been told that the only path to avoiding worsening of your diabetes is to lose weight by counting calories, limiting dietary fat, and/or exercising more. But studies show that when you reduce the sugars and starches in your diet, blood sugar improves even before weight loss occurs. If you have had difficulty losing weight in the past, this means it is still possible for you to improve your health. (See: Gannon & Nuttall, 2006).

As a person with prediabetes or type 2 diabetes, it is your choice: ***focus on lowered blood sugar <u>or</u> body weight as a measure of better health.***

How do I encourage my healthcare provider to help?

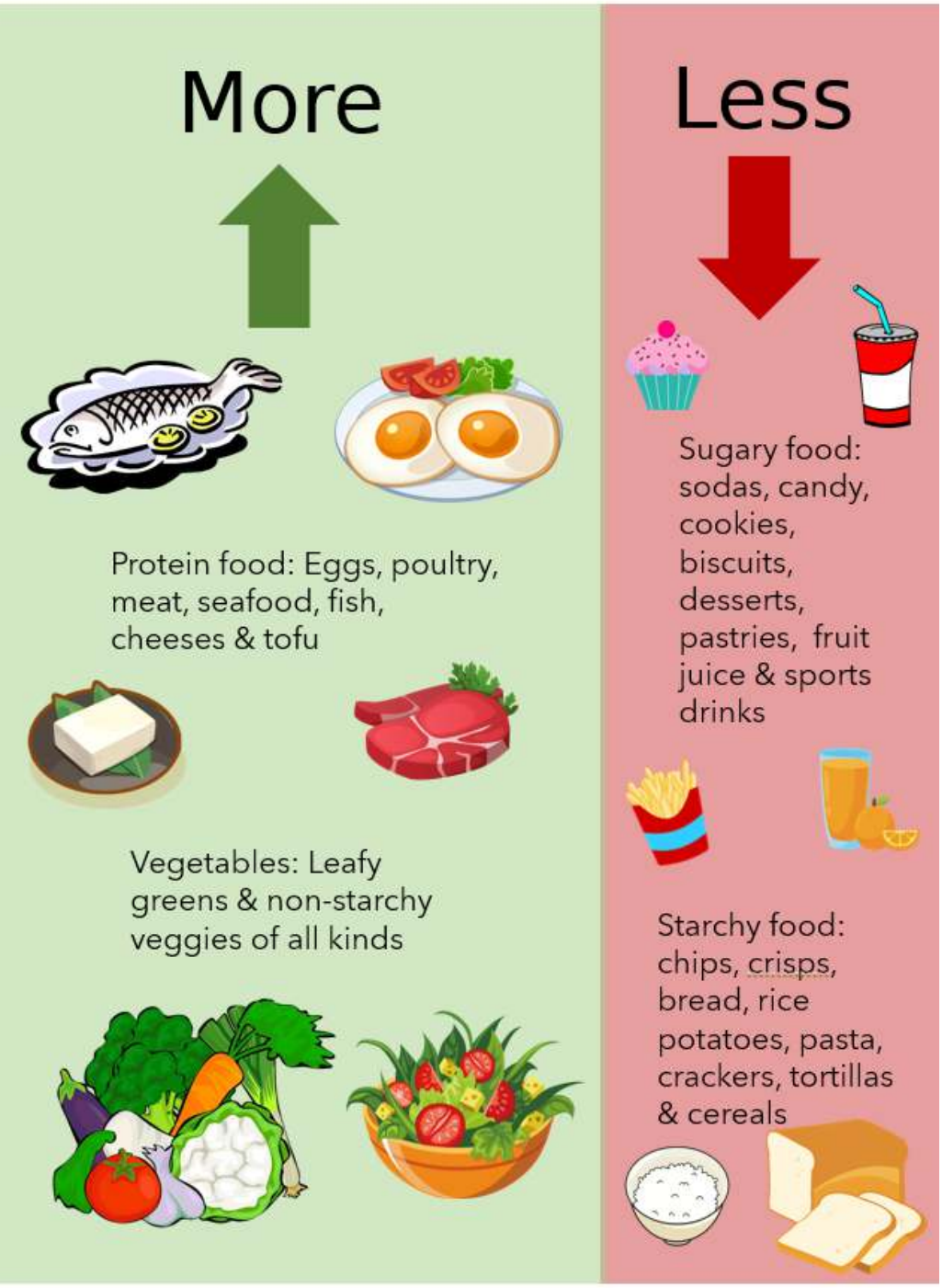
- Ask your healthcare provider to help you *safely* make diet and lifestyle changes.
- Provide your healthcare professional with the attached information.
- Discuss your desire to try getting your blood sugar in a healthy range through diet and lifestyle changes *first*.
- Plan necessary medication changes if you are limiting sugars and starches in your diet.
- Together, come up with a plan to monitor your blood sugar frequently.
- If your healthcare provider is unwilling to help you work on safely reversing your diabetes and reducing your medications, find one that will, if you have a choice.

> "Reducing overall carbohydrate intake for individuals with diabetes has demonstrated the most evidence for improving glycemia and may be applied in a variety of eating patterns that meet individual needs and preferences."

Diabetes Care 2019: Nutrition therapy for adults with diabetes or prediabetes: a consensus report.

Eating for metabolic health is easy.

No "diet." No counting.
No confusion. No hunger.



Choose foods you enjoy from the "more" list. Eat as much as you need.

Don't be afraid of fat; skip sugars & starches instead.

Prediabetes & type 2 diabetes:

For your clinician

Defining reversal and remission of type 2 diabetes

Type 2 diabetes outcome	Criteria and cut-offs used
Reversal	HbA1c below 6.5% (7.8 mmol/L; 47.4 mmol/mol) without any diabetes medication, except metformin
Partial remission	Two HbA1c measurements 5.7 - 6.5% (6.5 - 7.8 mmol/L; 38.8 - 47.4 mmol/mol) Over the course of 1 year No medications
Complete remission	Two HbA1c measurements below 5.7% (6.5 mmol/L; 38.8 mmol/mol) Over the course of 1 year No medications

From: Athinarayanan et al., 2019; Buse et al., 2009

Education for clinicians

Low-carbohydrate nutrition approaches in patients with obesity, prediabetes, and type 2 diabetes This ebooklet provides a complete overview of managing patients using a reduced carbohydrate intervention for these conditions.

Diet Doctor's free continuing medical education course: Treating metabolic syndrome, type 2 diabetes, and obesity with therapeutic carbohydrate restriction This free three-hour course offers continuing education credits for physicians, nurses, and dietitians.

Clinical Guidelines for Therapeutic Carbohydrate Restriction (Society of Metabolic Health Practitioners): This overview of therapeutic carbohydrate reduction was created by clinicians experienced in using this approach in their patient populations.

Reverse Diabetes2 Now A Dutch program for helping individuals reverse type 2 diabetes, resulting in less medication, healthier blood values (HbA1c), and more energy.

Society of Metabolic Health Practitioners

metabolicpractitioners.org

Dear Clinician,

I hope your health and happiness have endured these unprecedented times. I write on behalf of the patient who presents this letter. Your patient is ready to take action and regain control of their health by using food and lifestyle changes.

The patient who presents this letter has done their research and believes reducing sugars and starches can improve their health and quality of life. They understand that therapeutic carbohydrate restriction may help them.

Your patient has found multiple resources to facilitate behavioral changes and a robust online community to foster sustainability. Your patient is self-driven and asks for your guidance in trending vital signs, monitoring blood work, and making changes to any medications accordingly so that these dietary changes are managed safely. Most importantly, your patient seeks your support and encouragement as part of their team.

Therapeutic carbohydrate reduction has been endorsed by the American Diabetes Association (ADA) and the Obesity Medical Association (OMA) as standards of care for the treatment of diabetes and obesity, respectively. However, the acceptance of this lifestyle is not ubiquitous in the medical community. If you have concerns about practicing with this standard of care, your documentation may include a statement that the low-carbohydrate lifestyle is a patient-lead initiative.

I encourage you to visit (insert website) for physician resources on low carbohydrate lifestyles. If you have any questions, please reach out to clinicians@metabolicpractitioners.org.

With Gratitude,
Christine Najjar, MD, MS
Education Committee Society of Metabolic Health Practitioners

Type 2 Diabetes: Diabetic Medications on a Low Carbohydrate Diet - A Summary & Suggestions

There are three considerations with the use of diabetic medications in type 2 diabetes when on a low carbohydrate diet:

- Is there a risk of hypoglycaemia?
- What is the degree of carbohydrate restriction?
- Does the medication provide any benefit, and if so, do any potential benefits outweigh any side effects and potential risks?

Drug Group	Action	Hypo risk?	Suggested action (to continue/stop)
Sulfonylureas	Increase pancreatic insulin secretion	**YES**	**STOP** (or if gradual carbohydrate restriction then wean by e.g. halving dose successively)
Insulins	Exogenous insulin	**YES**	**REDUCE/STOP** (Change to basal only and wean appropriately, e.g. successive 30-50% reductions, towards elimination) *see below
Meglitinides	Increase pancreatic insulin secretion	**YES**	**STOP** (or if gradual carbohydrate restriction then wean by e.g. halving dose successively)
Biguanides	Reduces insulin resistance	No	Optional, consider clinical pros/cons.
GLP-1 agonists	Slow gastric emptying. Glucose dependent pancreatic insulin secretion.	No	Optional, consider clinical pros/cons (expensive).
SGLT-2 inhibitors	Increase renal glucose secretion	No	Usually stop. Concern over possible risk of ketoacidosis (though this risk may be with LADA that has been misdiagnosed as T2DM). Use in selected patients may be beneficial in early reversal.
Thiazolidinediones	Reduce peripheral insulin resistance	No	Usually stop. Concern over risks usually outweighs benefits.
DPP-4 inhibitors	Inhibit DPP-4 enzyme	No	Stop. No significant risk, but no benefit in most cases.
Alpha-glucosidase inhibitors	Delay digestion of starch and sucrose	No	Stop. No benefit on a low carbohydrate diet.
Blood glucose testing strips	Provide feedback on the blood glucose response to food	N/A	Some people may find a period of measuring blood glucose helpful for informing them about the effect of various foods on blood glucose. This can support behaviour change. A period of measurement may also be useful if HbA1c is not improving as expected.

*Insulin reduction suggestion Tailor to individual. If using basal-bolus regime convert to long-acting insulin only, BD in equal doses (OD may suit some people). If a very low carbohydrate diet is planned any bolus insulin dosing can simply be eliminated. On commencing low carbohydrate diet reduce insulin by 30-50%. Monitor QDS initially for hypoglycaemia (rescue glucose if required). Continue down-titration of insulin as insulin resistance improves (can take months). Goal for most can be to eliminate insulin.

Caution: Some people with T2DM may have pancreatic insufficiency. Also people with other forms or pancreatic insufficiency (e.g. LADA or T3c) may have been misdiagnosed as T2DM. Consider this if rapidly increasing HbA1c, thirst, polydipsia, weight loss, low C-peptide. Insulin should not be eliminated in this cohort.

Hypoglycemic Medication Deprescribing

Category	Examples	Priority	Insulin Effect	Effect on Weight	A1C Lowering	Hypogylcemia Risk on LC	Daily BG Monitoring
Insulin		**1**	↑↑↑↑	↑↑↑	↓↓↓	↑↑↑↑	4 (ac & hs)
Sulfonylureas	Gliclazide (Diamicron) Glimepiride (Amaryl) Glyburide (Diabeta)	**2**	↑↑↑	↑↑	↓↓	↑↑↑	2+
Meglitinides	Nateglinide (Starlix) Repaglinide (GlucoNorm)	**2**	↑↑↑	↑↑	↓ to ↓↓	↑↑↑	2+
SGLT2 Inhibitors	Canagliflozin (Invokana) Dapagliflozin (Forxiga) Empagliflozin (Jardiance)	**2**	↓↓	↓	↓↓ to ↓↓↓	↑↑↑	2+
DPP4 Inhibitors	Alogliptin (Nesina) Linagliptin (Trajenta) Sitagliptin (Januvia) Saxagliptin (Onglyza)	**3**	↑	-	↓↓	↑ to ↑↑	2+
GLP1 Receptor Agonists	Liraglutide (Victoza) Exenatide (Byetta) Exenatide QW (Bydureon) Albiglutide (Eperzan) Dulaglutide (Trulicity)	**3**	↑	↓↓	↓↓ to ↓↓↓	↑ to ↑↑	2+
Thiazoledinediones	Pioglitazone (Actos) Rosiglitazone (Avandia)	**3**	-	↑	↓↓	↑	2
Biguanides	Metformin	**4**	↓	-	↓↓	↑	Fasting+
α-Glucosidase Inhibitor	Acarbose	**4**	↓	-	↓	-	-

* Adapted from 2016 Diabetes Canada Guidelines - http://guidelines.diabetes.ca/cdacpg_resources/Ch13_Table1_Antihyperglycemic_agents_type_2_2016.pdf

Insulin Deprescribing – Day 1 Recommendations*

Category	Examples	LCKD (<40g)	LC (40-80g)	LC (80-130g)	Daily BG Monitoring
Bolus (Prandial Insulin)					
Rapid-acting analogues	Aspart (NovoRapid) Glulisine (Apidra) Lispro (Humalog) Lispro U200 (Humalog U200)	Usually not required	Dose based on net carb content of meal	Dose based on net carb content of meal	4+ (ac & hs)
Short-acting (Regular)	Humulin-R, Novolin geToronto	Usually not required	Dose based on net carb content of meal	Dose based on net carb content of meal	4+ (ac & hs)
Basal Insulins					
Intermediate-acting (NPH)	Humulin-N Novolin ge NPH	Reduce by 50%	Reduce by 25%	Reduce by 10%	4+ (ac & hs)
Long-acting basal analogues	Detemir (Levemir) Glargine (Basaglar, Lantus) Glargine U300 (Toujeo) Degludec (Tresiba)	Reduce by 50%	Reduce by 25%	Reduce by 10%	4+ (ac & hs)
Premixed Insulins					
Premixed Regular/NPH	Humulin 30/70 Novolin ge 30/70, 40/60, 50/50)	Switch to basal insulin in divided doses & reduce as above (subtract prandial portion from total)	Consider switch to basal insulin or Reduce by 25%	Reduce by 10%	4+ (ac & hs)
Biphasic insulin aspart	NovoMix 30			Reduce by 10%	4+ (ac & hs)
Insulin lispro/lispro protamine suspension	Humalog Mix25 Humalog Mix50			Reduce by 10%	4+ (ac & hs)

* Insulin doses must be individualized based on clinical response. Recommendations are guidelines only and do not substitute for good clinical judgement