

4+2 Diabetes Reversal Strategy Guide

Contents

Introduction	3
Eat to Lower Insulin	8
Use Your Muscles	11
Be Kind to Your Liver	13
Restore Fat Burning	15
De-stress	17
Improve Sleep	19
Conclusion	21

Introduction



Type II Diabetes is a condition where your body loses its ability to maintain normal blood sugar (glucose) levels.

It is a disorder that develops gradually over ten to twenty years, is predictable well before it is diagnosed and is reversible.

Whether you are pre-diabetic, newly diagnosed or have had diabetes for years, understanding the process that has led to your diagnosis is the first step to reversal.

In Type II Diabetes, glucose levels become high due to a combination of two factors:

1. Excess fat results in your liver and muscle cells no longer responding properly to insulin—**insulin resistance**.
2. The amount of insulin required to overcome this resistance exceeds your pancreatic beta cell's capacity to create more insulin—**pancreatic capacity**.

Every person with Type II Diabetes has a unique threshold for each factor.

Your path towards diabetes began years ago when you started to gain weight.

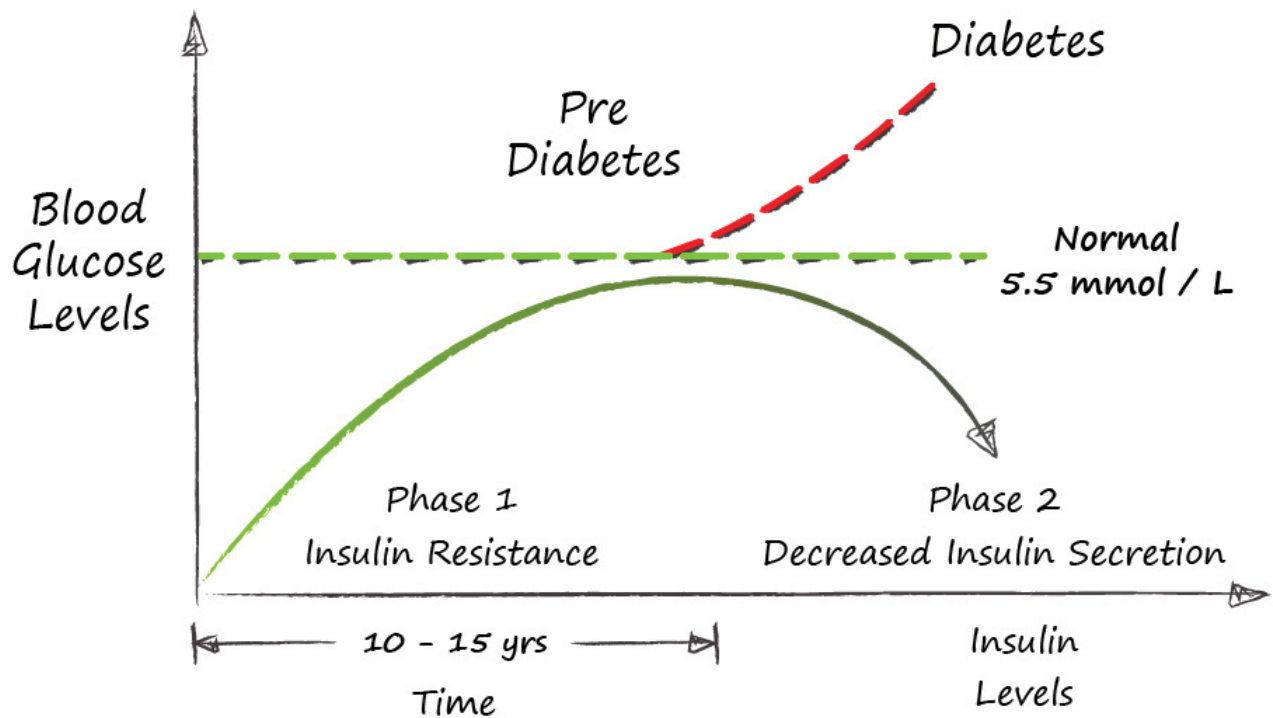
Insulin resistance is caused by energy overload.

You get energy from food, and if you don't use it, you store it as fat.

If you store too much fat, you overwhelm your body's healthy storage and fat spills over to places it does not belong. The point at which this happens is your **personal fat threshold**.

Unhealthy abdominal or belly fat grows, and throughout your body, fat enters cells and disrupts their function.

This ectopic fat significantly affects your muscle and liver cells, making them resistant to insulin, the energy storage hormone.



To overcome insulin resistance and maintain normal blood sugar, your pancreas releases more insulin.

More insulin leads to more energy storage, and high insulin levels inhibit your ability to burn fat, worsening the problem.

Insulin resistance resembles a turnstile on your fat—you can store fat but cannot burn it.

This results in one of the most common symptoms of insulin resistance—you are gaining weight while being frequently hungry.

Insulin resistance traps you in a 'vicious cycle'; high insulin levels lead to more fat storage, and more fat leads to more insulin resistance and even higher insulin levels.

The metabolic vicious cycle of insulin resistance is the primary driver of the obesity epidemic.

Your blood sugars remain normal as long as your pancreas can keep up by making more insulin.

Eventually, the pancreas reaches its limit, and you exceed your **pancreatic capacity**—you no longer make enough insulin to control blood glucose, and it begins to rise.

The same process of ectopic fat deposition also disrupts your pancreatic beta cell's ability to secrete insulin, and pancreatic function decreases.

When blood glucose levels exceed 6 mmol/L, we call this pre-diabetes. For most people, the process of insulin resistance leading to this point has been going on for 10-15 years, and over 50% of pancreatic beta cells have become dysfunctional.

As more of the pancreas is affected, high insulin levels plateau and begin to fall, and blood sugars rise to diabetic levels (> 7 mmol/L). By the time diabetes is diagnosed, over 80% of these cells no longer work properly.

Traditionally diabetes has been thought to be a chronic progressive disease that can be managed, slowed perhaps, but not reversed.

An emerging body of evidence suggests otherwise.

Reversing the energy overload and losing fat from the liver and the pancreas breaks the cycle.

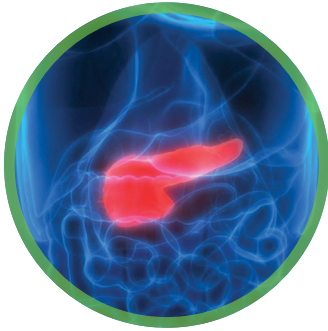
For most diabetics, about 400g (or 1 lb) of fat in the liver causes high insulin resistance. Losing this one pound of liver fat generally takes 30 to 35 lbs of overall weight loss.

Understanding insulin resistance allows you to align your behaviours to maximise your ability to reverse diabetes or prevent it in the first place.

The **4+2 Diabetes Reversal Strategy** leverages insights from Dr. Roy Taylor and others who have demonstrated that Type II Diabetes can be reversed.

Applying these principles can help break insulin resistance's metabolic 'vicious cycle.'

4 Steps to Reverse Insulin Resistance



Eat to Lower Insulin

The simplest way to take the load off the pancreas is to decrease the fast carbs that trigger insulin. Choosing slow carbs with lots of fibre will lower insulin release and is the first step to breaking the metabolic 'vicious cycle' of insulin resistance.



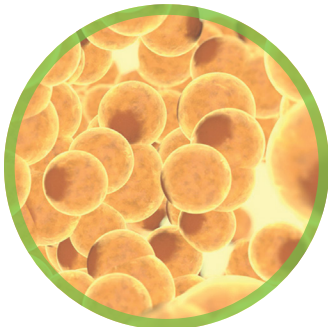
Use Your Muscles

Increased exercise helps to reverse insulin resistance, the process underlying Type II Diabetes, by improving glucose uptake and fat burning—even in the absence of weight loss. By using your muscles, you will restore a vital energy buffer—the "glucose sink."



Be Kind to the Liver

Fat in the liver is the biggest driver of insulin resistance and high insulin levels. As you seek to reverse insulin resistance, you need to be sure that you are not compounding the effect of energy overload by directly adding fat to the liver. Start by decreasing or eliminating alcohol and fructose. Then be sure to maintain gut health by eating whole foods with adequate fibre.



Restore Fat Burning

The first three steps of the 4+2 Diabetes Reversal Strategy set the stage for fat burning. To reverse insulin resistance and Type II Diabetes, you have to get rid of the fat in your liver and pancreas—and to do this, you need to lose weight. Our preferred method for weight loss is time-restricted eating: limiting the number of hours we eat and extending the fasting period.

* If you are on medications, seek medical guidance first.

+2 The Wildcards



Decrease Stress

Stress can worsen insulin resistance and impede the reversal of diabetes if you are unable to recover. High cortisol levels, the stress hormone, counteract many of insulin's actions while also increasing appetite. Improving stress tolerance helps by decreasing your stress reactions and improving your recovery from stress.



Improve Sleep

Lack of sleep increases cortisol and appetite. Getting enough sleep is key to reversing insulin resistance and Type II Diabetes—start by setting yourself up for a good night's sleep, give yourself an 8-hour sleep window and develop a sleep ritual to improve your sleep. If there are any signs or symptoms of obstructive sleep apnea—get a sleep assessment and investigate.

Eat to Lower Insulin

With insulin resistance, insulin levels are much higher than normal. Insulin is a storage hormone, so these high insulin levels cause you to store more energy as fat and suppress your ability to burn fat as fuel, leading to weight gain that further aggravates insulin resistance.

The first step in breaking this metabolic 'vicious cycle' is to eat in a way that requires less insulin.

Insulin, triggered by glucose entering the bloodstream, seeks to maintain tight control of glucose levels in the blood.

At normal blood glucose levels, there is only a single teaspoon of glucose in your bloodstream.

At rest, our bodies use about two teaspoons of glucose per hour.

Carbohydrates in your diet are broken down through digestion into sugar building blocks, with glucose being the most common.

Your pancreas releases insulin in proportion to the glucose absorbed from the carbohydrates you eat.



Two factors control the resulting blood glucose after you eat:

1. How quickly that carbohydrate is broken down and absorbed.

This is the **glycemic index**. Specifically, it provides a comparison of the food in question with pure glucose over a two-hour absorption period. By definition, glucose is set a 100. White bread has a glycemic index of 70, while broccoli is 17. Respectively, in a two hour period, for an equal amount of carbohydrate in each, you will absorb 70% and 17% as much glucose as ingesting pure glucose.

2. The amount of glucose from the carbohydrate.

Of course, the amount of carbohydrate in the food is also critical. Watermelon has a glycemic index of 80, but a usual portion only has 6 grams of carbohydrate.

Combining these factors, you get the **glycemic load**—the amount of carbohydrate absorbed from a portion of food over two hours.

So if the goal is to lower the amount of insulin required and break the metabolic ‘vicious cycle’ of insulin resistance, you will want to minimize the glycemic load of the food you eat.

In theory, if you limit the glycemic load of each meal to less than 16 g of glycemic load, minimal insulin will be required. Glucose will be absorbed at a similar rate to which it is being used.

This is also why walking for half an hour, twenty minutes after eating, helps control blood glucose rise.

The infographic we use converts glycemic load to a teaspoon of glucose equivalent—to remind you of how little glucose is circulating in your bloodstream at normal blood glucose levels.

Represented this way you can see the difference between fast carbs and slow carbs:

3/4 cups of white rice = **7** teaspoons of glucose

VS

3/4 cups of lentils = **1.3** teaspoons of glucose

Which food do you think will require more insulin?

Which food is likely to spike your blood sugar?

Most vegetables, fruits, legumes, and whole grains, while containing carbs, also contain significant fibre that slows glucose absorption and blunts insulin release.

Fibre also substantially affects your microbiome, the bacteria in your digestive tract. These effects decrease appetite, improve fat burning and improve insulin resistance.

Increasing fibre in your diet has been shown to improve blood sugar control and decrease insulin resistance. The best way to increase fibre is to eat more high-fibre foods you already enjoy.

Eating adequate protein also plays a significant role in eating to lower insulin. Adequate protein early in your meal ensures a better and smoother insulin response while generating your natural intestinal hormone release, improving insulin sensitivity and increasing satiation.

We recommend eating between 0.4 and 0.6 g/kg body weight of protein with each meal.

Avoiding fast carbs that trigger insulin, choosing slow carbs with lots of fibre and eating enough protein will lower your insulin requirements—this is your first step to break the metabolic 'vicious cycle' of insulin resistance.

In our 12 Weeks To Take Control of Your Diabetes Program, we can help you translate this strategy into actionable habits:

Habit 1 - Eliminate the White Stuff - Sugar & Flour

Habit 2 - Avoid Ultra-processed Foods

Habit 5 - Green Light, Yellow Light, Red Light Carbs

Habit 7 - Getting Enough Protein



Use Your Muscles

Increased exercise helps reverse insulin resistance, the process underlying Type II Diabetes, by improving glucose uptake and fat burning—even in the absence of weight loss.

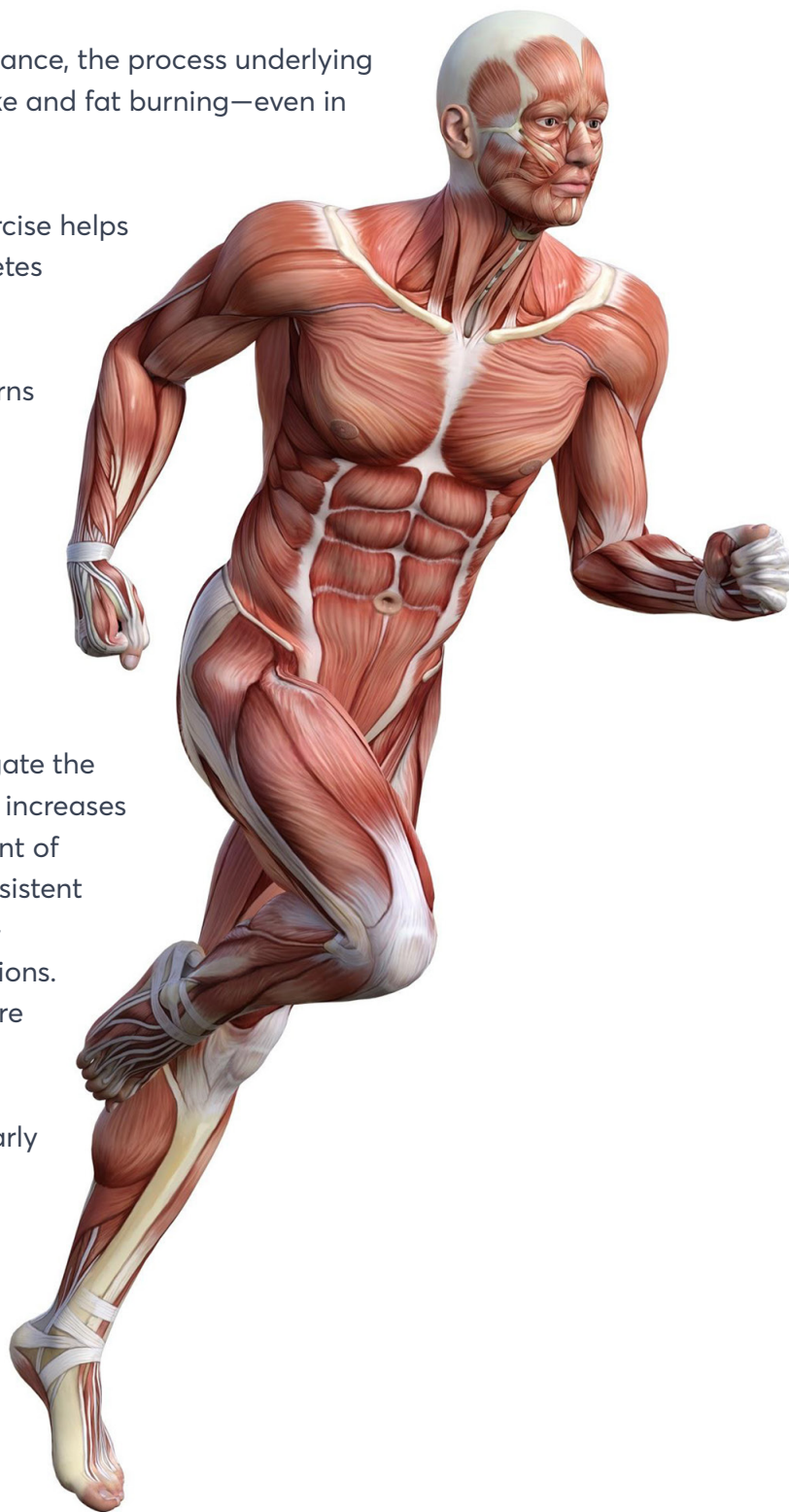
Combined with the other 4+2 principles, exercise helps maintain weight loss and contribute to diabetes reversal. Research shows that the amount of exercise required is not extreme— research demonstrates that all of the following patterns are effective in improving diabetic metrics:

- 150 minutes per week of moderate to vigorous activity
- 3 km of walking per day
- 8 km of running per week
- 20 minutes per day of moderate exercise

Exercise on its own is not enough—research shows that 8 hours per day of sitting will negate the positive effects of exercise. Prolonged sitting increases the risk of death (from all causes) independent of exercise. This negative effect of sitting is consistent across all ages, genders, and activity levels— regardless of weight or other medical conditions. From an evolutionary perspective, humans are meant to move.

Consistently moving, being active and regularly exercising is the best strategy.

One way to be sure that you get up regularly is to use a tracker to prompt you to stand and move every hour (Apple Watch, Fitbit, Garmin and others have this feature).



Once you are regularly reaching your 150 minutes per week target (Level 1), develop your portfolio of exercise:

- **Aerobic** - most of your exercise should be done at a pace that you can easily maintain a conversation.
- **High Intensity Interval Training** - 1 or 2 times per week, with adequate preparation.
- **Resistance exercise with or without weights** - 2-3 times per week, with particular attention to form.
- **Functional Movement** - 1-2 times per week, with particular attention to flexibility and balance.

**Above all, exercise should be fun,
and you should feel good after doing it!**

In our 12 Weeks To Take Control of Your Diabetes Program we can help you translate this strategy into actionable habits:

Habit 4 - 150 minutes exercise

Habit 8 - Be Active

Habit 11 - Resistance Training

Be Kind to Your Liver

Diabetes is a disease of energy overload. Energy we get from food, when eaten in excess, is stored as fat. Our ability to store fat healthily—mainly under the skin—is limited. When our healthy fat storage depots get full, fat begins to be stored elsewhere—most notably in our abdomen as visceral fat. As we start to store fat in the abdomen, we also begin to accumulate fat in liver, muscle and pancreas cells. This fat affects the action of insulin in those cells resulting in insulin resistance.

Compounding this, any carbohydrate that we eat in excess of what our muscles and liver can store as glycogen gets converted to fat. The liver exports this as triglyceride, but some of this fat also backs up in the liver.

When we are not eating, our livers are responsible for maintaining blood glucose by either breaking down glycogen (stored glucose) or creating glucose from protein, lactate or glycerol (gluconeogenesis). These processes are regulated by the pancreas, releasing glucagon to increase glucose production or insulin to slow it down.

When fat builds up in the liver, the liver becomes less sensitive to insulin, and the pancreas increases insulin levels.



Fat in the liver is the biggest driver of insulin resistance and high insulin levels.

When insulin levels are high, we lose our ability to burn fat, resulting in a situation where we can store fat but not lose it. Further fat storage increases fat build-up in the liver, worsening insulin resistance—resulting in a metabolic 'vicious cycle.'

Anything else that increases fat in the liver will throw fuel on the fire.

There are three major culprits that we need to be concerned about:

1. **Alcohol** - in energy overload will directly increase liver fat.
2. **Fructose** - the other half of sugar (sucrose is 50% glucose and 50% fructose).
Fructose in high concentrations gets turned into fat in the liver.
3. **Poor gut health** - leakage of bacteria from the gut into the bloodstream directly causes inflammation and fat build-up in the liver.

As we seek to reverse insulin resistance, we need to be sure that we are not compounding the effect of energy overload by directly adding fat to the liver—begin by decreasing or eliminating alcohol and fructose.

Then be sure to maintain gut health by eating whole foods with adequate fibre along with fermented foods.

Finally, be sure to address any chronic gut symptoms with a thorough nutrition assessment.

In our 12 Weeks To Take Control of Your Diabetes Program we can help you translate this strategy into actionable habits:

Habit 2 - Avoid Ultra-processed Foods

Habit 6 - Fe Fi Fo

Restore Fat Burning

As you have learned so far in this guide, diabetes can be thought of as a disease of energy overload.

Energy from food, stored as fat, gradually overwhelms the body's ability to buffer the excess.

Fat initially stored in healthy depots begins to be stored ectopically (in places it shouldn't be)—in the abdominal area (visceral fat) as well as the cells of muscle, liver and pancreas.

This ectopic fat, especially in the liver, impairs insulin action, resulting in the pancreas releasing more insulin to maintain blood sugars.

Higher insulin levels inhibit fat burning, resulting in more fat storage, further compounding the vicious cycle.

How to break the cycle?

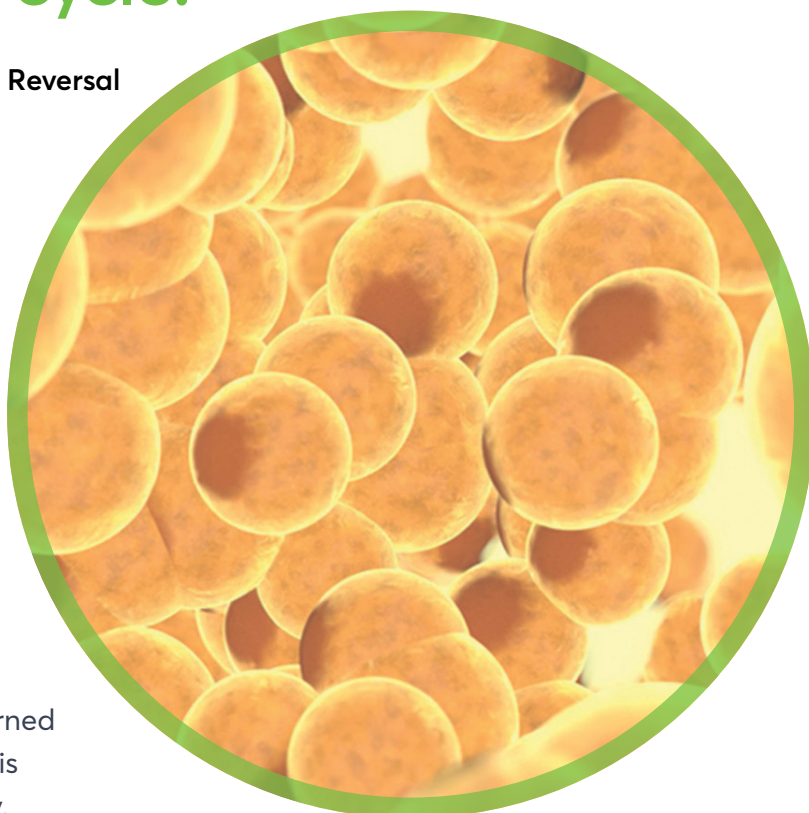
The first **three steps of the 4+2 Diabetes Reversal**

Strategy set the stage for fat burning:

1. **Eat to Lower Insulin** - lowers insulin levels to allow fat burning
2. **Use Your Muscles** - improves insulin sensitivity in the muscles, further reducing insulin requirements
3. **Be Kind to the Liver** - stops the addition of more fat to the liver

To reverse insulin resistance and diabetes, we have to get rid of the fat in the liver and pancreas—and to do this; we need to lose weight.

Weight loss requires that more fat is burned for fuel than is stored over time—and this requires restricting calories in some way.



Our preferred method for weight loss is time-restricted eating:

- Limiting the number of hours we eat and
- Extending the fasting period.

The most significant advantage to this is that insulin levels drop to very low levels after 6-8 hours of fasting, allowing the body to burn fat. Extending the fast expands the fat-burning window.

When burning fat, hunger hormones are low, decreasing hunger and craving, making the process relatively easy. Studies show that people on a 16:8 program (16 hr fast) consume fewer calories and rely on stored fat for fuel to a greater extent.

Time-restricted eating also cuts out nighttime snacking, which is a significant contributor to excess energy intake.

Once effective fat burning is restored, your hunger will decrease, and your satiation after meals is improved.

When doing time-restricted eating, avoid the temptation to go so long that you trigger extreme appetite—as you will overeat. It really should not feel hard. Progress gradually once 12 hours feels easy.

Adding easy Zone 2, aerobic exercise in a fasted state has been shown to improve visceral fat loss and is the closest thing we have to a magic wand to get rid of the 1 lb of liver fat that drives insulin resistance.

If you are on any diabetic medications—be sure to create a fasting plan with your physician. Fasting beyond 12 hours with some medications can cause dangerously low blood sugars—decreasing your dose may be required for you to progress.

In our 12 Weeks To Take Control of Your Diabetes Program we can help you translate this strategy into actionable habits:

Habit 3 - 12 Hours Fasting

Habit 4 - 150 minutes exercise

De-stress

Stress can worsen insulin resistance and impede the reversal of diabetes if we are unable to recover.

A healthy response to a stressful situation has two phases:

1. **Stress Phase** - the immediate physiological response that allows us to better cope with the situation at hand.
2. **Recovery Phase** - the adaptation response that allows us to adapt and get stronger.

Many factors determine your response to a stressor:

- **Environmental stressors**
- **Major life events**
- **Trauma, abuse**
- **Individual differences**
- **Behavioural responses**

ALL of which determine the extent of your physiological response.

Two systems mediate the stress phase:

- **The sympathetic nervous system** - which delivers the immediate response through adrenaline.
- **The hypothalamic-pituitary axis** - which delivers a more prolonged response through the hormone cortisol.



Cortisol is known as the stress hormone, it has many effects, but one of its major effects is to mobilize energy and maintain a steady supply of glucose for prolonged stress.

Cortisol does this by:

- Increasing production of glucose in the liver from the breakdown of glycogen.
- Promoting gluconeogenesis.
- A process that generates glucose from non-carbohydrate substrates—turning fats and proteins into glucose.
- Counteracting insulin's effect.
- Increasing appetite.
- Increasing food-seeking behaviour.

From these effects, it is apparent that anything that chronically increases cortisol will worsen insulin resistance.

There are three strategies to avoid the adverse effects of stress and cortisol:

1. **Decrease stressful situations** - this one is simple—avoid situations that add to your stress while offering limited value.
2. **Change your perception of what situations are stressful** - this is more complex. Using techniques like cognitive behavioural therapy, mindfulness and meditation can help decrease or eliminate the stress response by framing the situation in a different way.
3. **Enhance your ability to recover** - the other principles of the 4+2 Diabetes Reversal Strategy help. Whole food nutrition, exercise and adequate sleep are all essential to optimizing your recovery.

Improving stress tolerance takes time and does require practice—similar to exercise.

An excellent place to start is with an evening relaxation routine before going to sleep and planning for healthy activities that you know will de-stress you, like exercise, yoga, reading, hobbies or anything that will put you into a flow state.

In our 12 Weeks To Take Control of Your Diabetes Program we can help you translate this strategy into actionable habits:

Habit 10 - Mindfulness

Habit 12 - Mindful Eating

Improve Sleep

Too much or too little sleep is associated with an increased risk for Type II Diabetes.

Research shows that short-term sleep restriction leads to increased appetite, food intake, weight gain and insulin resistance due to increased stress response and the associated high levels of cortisol.

Approximately one-third of adults either sleep too much or too little, while at least another 10% have moderate to severe obstructive sleep apnea (OSA).

OSA is characterized by the collapse of the upper airway during sleep resulting in:

- Intermittent hypoxia (low oxygen levels).
- Sleep fragmentation.

OSA is associated with the development of insulin resistance and Type II Diabetes.

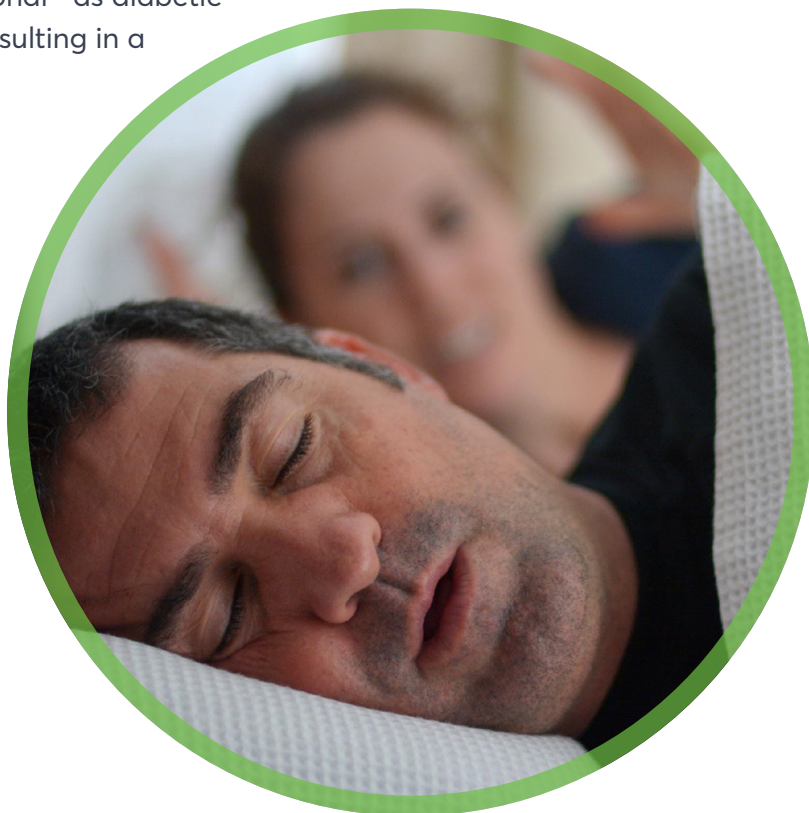
This relationship may also be bi-directional—as diabetic nerve damage may also cause OSA—resulting in a ‘vicious cycle.’

OSA creates the perfect storm:

- Lack of sleep drives increased appetite and lack of satiation leading to weight gain—weight gain worsens OSA.

Sleep fragmentation and intermittent hypoxia both cause:

- Increased inflammation.
- Increased oxidative stress.
- Increased stress response.
- Increased cortisol levels.



In turn, these processes worsen insulin resistance and affect the pancreas' ability to release insulin, eventually causing Type II Diabetes.

These processes also trigger increased blood pressure and increase the risk of cardiovascular disease.

OSA is treatable and under-diagnosed, especially in people with insulin resistance and diabetes.

The key symptoms are:

- Loud snoring,
- Fatigue, and
- Daytime sleepiness.

Other symptoms may include one or more of the following:

- Restless sleep.
- Awakening with choking and gasping.
- Morning headaches, dry mouth, or sore throat.
- Waking up to urinate more than once per night.
- Feeling unrested and groggy in the morning—"brain fog."
- Fatigue, low energy, memory challenges with difficulty concentrating.

Getting enough sleep is key to reversing insulin resistance and Type II Diabetes—start by setting yourself up for a good night's sleep, give yourself an 8-hour sleep window and develop a sleep ritual to improve your sleep. If there are any signs or symptoms of OSA—get a sleep assessment and investigate.

In our 12 Weeks To Take Control of Your Diabetes Program we can help you translate this strategy into actionable habits:

Habit 9 - Sleep Sounder

Conclusion



If you have made it this far, you should realize that:

- Type II Diabetes is reversible and
- There are many actions that you can take

Our approach is evidence-based, simple and sustainable.

While you can do this on your own, you do not need to. In fact, we see better results when people do this as part of a comprehensive program.

Our 12 Weeks To Take Control of Your Diabetes Program has been designed to help people like you make the leap from contemplation ("this sounds interesting") to action ("I'm doing this and it works").

It includes:

- 12 Virtual Group Sessions
- Videos, Weekly Lessons, Downloads and Recipes
- Virtual Fitness Visits

This program is led by a Lifestyle Medicine physician and paired with an assessment where you can learn the key variables of your own diabetes:

- Your Personal Fat Threshold
- The degree of Insulin Resistance you currently have and
- Your Pancreatic Capacity

The assessment will also help you prioritize which actions will be most impactful based on your own data.

If you need more support you can do the program with 1:1 guidance of a registered dietitian and get:

- A personalized 4+2 Plan
- 6 personal 1:1 sessions to tailor the program to your needs

Learn more about the 12 Weeks To Take Control of Your Diabetes Program at DiabetesReversal.com



JOIN OUR **FREE** 12 WEEKS TO Take Control of Your Diabetes Program

Learn the 4+2 Diabetes Reversal Strategy—a comprehensive, evidence-based approach to diabetes reversal. **FREE** with provincial health coverage in BC, Alberta and Ontario.

HOW IT WORKS

Our 12-Week Program

✓ Fully Covered in BC, AB, and ON

Our program is 100% virtual. You can access sessions and materials from the comfort of your home.



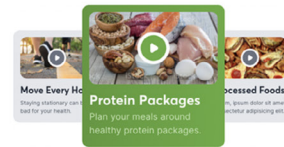
Virtual Physician Visits

Consultations with our physicians are done by video call, and can be completed from any computer, tablet, or phone.



12 Virtual Group Sessions

In groups of 15-30, you will attend weekly virtual sessions with a physician where you can ask questions and hear about the successes and challenges of others.



Videos & Weekly Lessons

Watch videos explaining core concepts, print out reference guides and cheatsheets, and complete ongoing learning exercises.

How often do you sleep 7-8 hours?

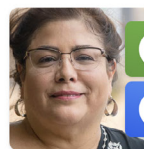
- ☐ Every day
- ☐ Most days
- ☐ 3-4 nights per week
- ☐ Less than 3 nights per week

8.9

SLEEP SCORE

Self-Assessments & Exercises

Answer questions and complete exercises to show where you're doing well and where you need to focus.



REPORT Insulin Resistance

REPORT Pancreatic Function

Personal Health Reports

Different people are, well, different. Understand what your lab results and other markers show about your current health and diabetic reversal path.

For more info, please visit lifestyleRx.ca