

# Q&A: Liquid low-calorie or low-carb keto diet can reverse type 2 diabetes, research shows

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Laura Saslow, associate professor at the University of Michigan School of Nursing, has been researching the impact of different dietary patterns

on type 2 diabetes for more than a decade.

Saslow reviewed a large body of clinical trial evidence for type 2 [diabetes](#) remission and reversal through various diets and found that both a liquid low-calorie eating plan or a very low-carbohydrate ketogenic diet can cause remission or reversal of type 2 diabetes, and reduce or eliminate the need for medication.

She discusses what worked for people with diabetes and what didn't.

## **What is type 2 diabetes?**

Type 2 diabetes arises from two issues: cells develop resistance to insulin, which prevents them from absorbing sufficient sugar, and the pancreas is unable to produce adequate insulin to maintain normal [blood sugar](#) levels.

Insulin, a hormone from the pancreas, manages blood sugar by promoting its uptake into cells, thus lowering sugar levels in the bloodstream. As this system falters in type 2 diabetes, impaired insulin function and production lead to chronically [high blood glucose](#), increasing the risk of vascular damage and other complications.

## **What were the main findings of your trial on a very low-calorie diet for diabetes remission?**

In the Diabetes Remission Clinical Trial, about 300 people in the United Kingdom either chose to be in a control group or to follow a very low-calorie liquid diet (about 850 calories) for about three months. The low-calorie group stopped taking diabetes and high blood pressure medications at the start, and after about three months they slowly reintroduced regular food and got help to maintain their [weight loss](#).

After one year, 46% of people in the low-calorie group went into remission, and after two years, 36% were still in remission. Only 2%–4% of people in the control group went into remission.

## **What were the main findings of the Indiana University trial on a very low-carbohydrate ketogenic diet for diabetes reversal or remission?**

In the Indiana University trial, led by Sarah Hallberg, about 350 people chose to follow the standard of care for diabetes or to follow a very low-carbohydrate ketogenic diet, sometimes called a keto diet. Following a keto diet means eating very few carbohydrates, roughly 20–35 nonfiber grams of carbohydrates a day, to reach a state called ketosis, during which the body switches its primary energy source from glucose to fats.

This helps control blood sugar levels by reducing the amount of carbs that cause blood sugar spikes. This way of eating allows low-carbohydrate, high-fat foods like beef, pork, chicken, fish and seafood; high-fat cheeses; and low-carbohydrate vegetables like avocado, spinach, eggplant, cucumber, zucchini, green peppers, broccoli and cauliflower.

People eating this way can replace high-carb flour with almond and coconut flour and include healthy fats such as olive oil, butter and coconut oil. They avoid grains, sugars and most fruits to maintain stable, lower blood sugar levels.

The Indiana University study showed a big drop in medication use among people on the keto diet. About 60% of those using insulin stopped needing it entirely.

Medication use went down a lot in the keto group, unlike the control group where it stayed the same or went up. Overall, 47% of people on

the keto diet achieved remission or reversal after one year and 38% after two years. In the control group, 7–10% of people achieved remission or reversal after 1-2 years.

## **Are there any new dietary approaches that show promise for diabetes remission?**

Yes, continuous glucose monitoring combined with advice shows promise. A study in India found that 63% of people using continuous glucose monitoring-based advice achieved remission after one year, compared to none in the control group.

The dietary advice focused on eating more vegetables and protein, leading people to cut their carbohydrate levels in half on average, to about 150 grams of carbohydrates a day. This, and other research, suggests that this approach could be useful in managing type 2 diabetes.

## **Which diets or interventions are less effective for diabetes remission?**

Low-calorie, low-fat diets and Mediterranean diets have shown lower remission rates. For example, the Look AHEAD trial found only an 11% remission rate after one year with a low-calorie, low-fat diet. Similarly, a Mediterranean diet study showed only a 14% remission rate after one year. Other diets like vegan, vegetarian and DASH diets have very limited and low-quality clinical trial evidence for type 2 diabetes remission or reversal.

## **How common is type 2 diabetes in the U.S.?**

About 15% of adults in the U.S. have diabetes, and most of them have type 2 diabetes. Also, one-third of adults have prediabetes. So, half of all

adults in the U.S. have either prediabetes or type 2 diabetes. It costs a lot, too—around \$413 billion each year. People with diabetes make up a quarter of all health care spending in the U.S.

## **What do 'remission' and 'reversal' mean for people with type 2 diabetes?**

Remission means your blood sugar levels are below the diabetes range for at least three months without using any diabetes medicine. Reversal means your blood sugar levels are below the diabetes range without any diabetes medicine, or only using metformin, which is a common diabetes drug. Remission or reversal are relatively rare.

A study in the U.S. involving 122,781 individuals found that over seven years, only 1.6% of participants experienced remission. The likelihood of [remission](#) rose to 4.6% for those who had been diagnosed with type 2 diabetes for less than two years.

## **What dietary studies did you review?**

I looked at every randomized or nonrandomized dietary clinical trial I could find with at least 50 people in each group who had been tracked for at least a year.

## **Where can people find resources about eating plans for type 2 diabetes?**

A very low-calorie [program](#) is available at the University of Michigan. A weight [navigation program](#), which can support you in a very low-carbohydrate, ketogenic approach is also available at the University of Michigan.

Online resources about a ketogenic diet include: [Diet Doctor](#); Low Carb Program; [Virta Health](#); [Low Carb Jumpstart](#) from the Michigan Collaborative for Type 2 Diabetes. Cookbooks: [The Wholesome Yum Easy Keto Cookbook](#); [The Everyday Ketogenic Kitchen](#); [The Easy 5-Ingredient Ketogenic Diet Cookbook](#).

Because a [ketogenic diet](#) can lower blood glucose and blood pressure, your doctor may need to reduce your medications for these conditions because, for example, there is a risk your blood sugar could go dangerously low. See more information on [Diet Doctor](#) or [Michigan Collaborative for type 2 Diabetes](#) Saslow's [review](#) of the clinical trial evidence of eating patterns for type 2 diabetes is available free online this year as part of the [Sarah Hallberg Legacy Course](#), which was produced in honor of the late Hallberg, a physician and researcher who led a significant clinical trial on diabetes reversal. Hallberg's [TEDx talk](#) on reversing diabetes through carbohydrate reduction has been viewed over 11 million times.

Provided by University of Michigan

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