

Prediabetes remission for type 2 diabetes prevention: Researchers advocate normalization of blood sugar regulation

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1. Prediabetes is defined by the American Diabetes Association (ADA) as follows:

- an HbA1c value of 5.7 to 6.4% (39 to 47 mmol/mol) or
- a fasting blood sugar level (FPG) of 100 mg/dL (5.6 mmol/L) to 125 mg/dL (6.9 mmol/L) (impaired fasting glucose) or
- a 2-hour blood glucose concentration during the 75-g oral glucose tolerance test (OGTT) of 140 mg/dL (7.8 mmol/L) to 199 mg/dL (11.0 mmol/L) (impaired glucose tolerance)

2. Criteria for prediabetes remission:

- a fasting blood sugar level (FPG) <5.6 mmol/l (100 mg/dL)
- a 2-hour plasma glucose concentration during the 75-g OGTT <7.8 mmol/l (140 mg/dL)
- HbA1c <5,7%

Prediabetes Definition by the American Diabetes Association (ADA) and Prediabetes Definition. Credit: DZD

Current medical guidelines recommend that people in a preliminary stage of type 2 diabetes lose at least 7% of their body weight in order to prevent manifest diabetes. In an [article](#) in *Nature Reviews Endocrinology*, diabetes experts Prof. Andreas Birkenfeld and Prof. Viswanathan Mohan advocate glycemic remission (normalization of blood sugar regulation) as a prevention goal for people with prediabetes or a high risk of type 2 diabetes. The article's claim is supported by numerous

international scientists as well as by the DZD's Prevention Academy.

Prediabetes is the greatest risk factor for the development of type 2 diabetes (T2D). In the preliminary stage of diabetes, fasting blood sugar is already elevated and glucose tolerance is impaired. To prevent the development of T2D and damage to blood vessels, [lifestyle changes](#), such as diet and more exercise, are usually used to combat [prediabetes](#).

The US guidelines from the American Diabetes Association (ADA) recommend reducing body weight by at least 7%. Nevertheless, the number of diabetes mellitus cases has almost quadrupled since 1980 and the incidence continues to rise—especially in low-income countries. In low- and [middle-income countries](#), the global age-standardized mortality rate for diabetes has also risen by 13% over the past 15 years.

According to the two authors, improved strategies are needed to reduce the massive increase in the incidence and prevalence of T2D worldwide and to address the disparities in rates of diabetes mellitus. In addition to weight reduction, they also advocate for incorporating the normalization of blood sugar regulation into diabetes prevention.

Normalizing blood sugar regulation

The concept of "prediabetes [remission](#)" was established in analyses of the Prediabetes Lifestyle Intervention Study (PLIS) of the German Center for Diabetes Research (DZD) and the US Diabetes Prevention Program (DPP). The studies showed that in some patients with prediabetes (~40%), [weight loss](#) ($\geq 5\%$ of original body weight) led to prediabetes remission.

Fasting [blood sugar](#), glucose tolerance and HbA1c levels normalized in this group. Participants who had achieved remission showed a 73% reduced risk of developing T2D even two years after the end of the

lifestyle intervention. They also showed reduced markers of kidney damage and better condition of their [blood vessels](#). Some of the participants did not achieve remission despite losing weight and still had prediabetes.

Mechanisms of prediabetes remission

Studies have shown that a greater reduction in visceral abdominal fat and improved [insulin sensitivity](#) are crucial in achieving prediabetes remission.

The authors' hypothesis is that improving [insulin resistance](#) promotes remission from prediabetes to normal glucose regulation. This could indicate that prediabetes remission targets a point in time at which the [beta cells](#) are not yet permanently damaged to a clinically relevant extent. This could make prediabetes a window of opportunity to preserve beta cell function in the long term.

Does prediabetes remission reduce the risk of T2D?

Researchers investigated whether weight loss-induced prediabetes remission is more effective than the currently recommended strategies for preventing type 2 diabetes. They analyzed the data of 480 participants in the Diabetes Prevention Program (DPP) who had prediabetes and had lost at least 7% of their weight through a one-year lifestyle intervention.

Blood sugar levels normalized in 114 people (prediabetes remission), while the majority of the 366 participants did not improve their blood glucose regulation. Preliminary results indicate that individuals who achieved prediabetes remission in combination with weight loss of $\geq 7\%$ reduced their relative risk of diabetes mellitus by 76% over six years

compared to weight loss of $\geq 7\%$ alone.

The authors suggest that remission to normal glucose regulation should be considered in prevention strategies for people with prediabetes.

Weight loss plays a decisive role in this regard. The results suggest that people with prediabetes who do not achieve remission after losing at least 7% of their body weight should continue to lose weight until they reach their individual threshold or take other measures.

"We believe that prediabetes remission should be considered in future studies and guidelines as it has the potential to protect beta cell function from the development of type 2 diabetes and possibly reduce the rising incidence and prevalence of type 2 [diabetes](#) worldwide," says Prof. Birkenfeld. Future studies should clarify whether prediabetes remission can also lead to reduced complication rates.

More information: Andreas L. Birkenfeld et al, Prediabetes remission for type 2 diabetes mellitus prevention, *Nature Reviews Endocrinology* (2024). [DOI: 10.1038/s41574-024-00996-8](https://doi.org/10.1038/s41574-024-00996-8)

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