

Type 2 Prediabetes in Children and Adolescents

What is Prediabetes?

Type 2 prediabetes in children and adolescents is a condition characterized by elevated blood sugar levels (glucose) that are higher than normal but not yet high enough to be classified as type 2 diabetes. Prediabetes is considered a precursor to type 2 diabetes, and it indicates an increased risk of developing the full-blown disease in the future.

Prediabetes in children and adolescents is primarily associated with lifestyle factors, including poor diet, sedentary behavior, and excess weight or obesity. These factors contribute to insulin resistance, a condition in which the body's cells become less responsive to the effects of insulin, resulting in higher blood sugar levels.

What Causes Prediabetes?

Risk factors for type 2 prediabetes in children and adolescents include:

1. **Family history:** Having a family history of type 2 diabetes increases the risk of developing prediabetes and type 2 diabetes.
2. **Excess weight or obesity:** Being overweight or obese is a significant risk factor for developing prediabetes and type 2 diabetes. Excess adipose tissue, particularly around the abdomen, contributes to insulin resistance and impaired glucose metabolism.
3. **Physical inactivity:** Lack of regular physical activity or exercise contributes to insulin resistance and increases the risk of developing prediabetes and type 2 diabetes.
4. **Unhealthy diet:** Consuming a diet high in refined carbohydrates, sugars, and unhealthy fats, along with inadequate intake of fruits, vegetables, and fiber, increases the risk of prediabetes and type 2 diabetes.

5. Ethnicity: Certain ethnic groups, including African American, Hispanic/Latino, Native American, Asian American, and Pacific Islander populations, have a higher prevalence of prediabetes and type 2 diabetes.
6. Puberty: During puberty, hormonal changes can affect insulin sensitivity and glucose metabolism, increasing the risk of prediabetes and type 2 diabetes in adolescents.
7. Gestational diabetes: Being born to a mother who had gestational diabetes during pregnancy increases the risk of developing prediabetes and type 2 diabetes later in life.

What Are the Signs and Symptoms of Prediabetes?

Prediabetes typically does not cause noticeable symptoms in its early stages, which is why it is often referred to as a "silent" condition. One possible sign of prediabetes is skin darkening on certain parts of your body, including your neck, underarms, elbows, knees, knuckles, and skin folds on your abdomen. This skin issue is called *acanthosis nigricans*, which is a sign of insulin resistance.

However, as prediabetes progresses, some individuals may experience mild symptoms related to elevated blood sugar levels. Common signs and symptoms of prediabetes may include:

1. Increased thirst (polydipsia): Elevated blood sugar levels can lead to increased thirst as the body attempts to dilute excess glucose in the bloodstream by increasing fluid intake.
2. Frequent urination (polyuria): Excess glucose in the bloodstream is excreted in the urine, leading to increased urination as the kidneys work to remove the excess sugar from the body.
3. Increased hunger (polyphagia): Despite eating regularly, individuals with prediabetes may experience increased hunger due to the body's inability to effectively use glucose for energy.
4. Fatigue: Fluctuations in blood sugar levels can lead to feelings of fatigue and tiredness, even after getting adequate rest.
5. Blurred vision: High blood sugar levels can cause changes in the shape of the lens of the eye, resulting in blurred vision or difficulty focusing.
6. Slow-healing wounds: Elevated blood sugar levels can impair the body's ability to heal and fight infections, leading to slow-healing wounds, cuts, or bruises.

7. Recurrent infections: Individuals with prediabetes may be more susceptible to infections, such as urinary tract infections, yeast infections, or skin infections, due to impaired immune function associated with elevated blood sugar levels.

How is Prediabetes Diagnosed?

Prediabetes is typically diagnosed through blood tests that measure blood sugar levels. There are several common tests used to diagnose prediabetes:

1. Fasting plasma glucose (FPG) test: This test measures blood glucose levels after fasting for at least 8 hours. A blood sample is taken in the morning before eating or drinking anything except water. A fasting plasma glucose level between 100 and 125 milligrams per deciliter (mg/dL) is considered indicative of prediabetes. A fasting plasma glucose level of 126 mg/dL or higher on two separate occasions is diagnostic of diabetes.

	Normal	Prediabetes	Diabetes
Fasting glucose	<100	100-125	>126
@2 hours glucose	<140	140-199	>200

2. Oral glucose tolerance test (OGTT): In this test, the individual drinks a sugary solution containing a standardized amount of glucose, and blood glucose levels are measured before and 2 hours after consuming the solution. A 2-hour plasma glucose level between 140 and 199 mg/dL after the glucose challenge is indicative of prediabetes. A 2-hour plasma glucose level of 200 mg/dL or higher is diagnostic of diabetes.

3. Hemoglobin A1c (HbA1c) test: The HbA1c test measures the average blood glucose levels over the past 2-3 months by assessing the percentage of hemoglobin that is glycated (attached to glucose molecules). A hemoglobin A1c level between 5.7% and 6.4% is considered indicative of prediabetes. A hemoglobin A1c level of 6.5% or higher is diagnostic of diabetes.

	Normal	Prediabetes	Diabetes
Hemoglobin A1c	<5.7	5.7-6.4	>6.4
%			

All of these tests can be performed in a healthcare provider's office or laboratory. They are typically included as part of routine blood work or screening tests for diabetes.

It's important to note that a diagnosis of prediabetes is made based on the results of one of these tests, not just a single abnormal reading.

How is Prediabetes Treated?

It's essential to identify and address prediabetes in children and adolescents to prevent or delay the onset of type 2 diabetes and reduce the risk of associated complications. Lifestyle modifications, including healthy eating habits, regular physical activity, and weight management, are the cornerstone of treatment for type 2 prediabetes in children and adolescents. In some cases, healthcare providers may also recommend medications, such as metformin, to help improve insulin sensitivity and lower blood sugar levels.

Regular medical follow-up and monitoring are essential for children and adolescents with prediabetes to assess progress, reinforce healthy behaviors, and prevent the progression to type 2 diabetes. Early intervention and lifestyle modifications can help reduce the risk of type 2 diabetes and improve long-term health outcomes in children and adolescents at risk for prediabetes and type 2 diabetes.