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Diabetes in Idaho: Prevalence, Types, and Management Prevention Strategies

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Introduction

DIABETES IS A COMMON condition affecting millions of Americans, including one in ten Idahoans. However, with healthy lifestyle changes and the advancements in screening, cell therapies, and more, diabetes can be prevented or effectively managed.

Diabetes is a disease that affects the pancreas, an organ located in the upper part of the abdomen (Figure 1). The pancreas constantly works to control blood sugar by producing the hormone, insulin. Many factors affect blood sugar levels, including diet, physical activity, stress, and illness. Throughout the day, blood sugar changes as you consume foods, particularly those with carbohydrates (nutrients that raise blood sugar and give you energy).

The human body processes two types of carbohydrates, food nutrients that affect a body's blood sugar level differently. **Simple carbohydrates** include foods like soda, candy, or fast food, but fruit also contains them. Simple carbohydrates raise blood sugar more rapidly than complex ones, which can make it difficult for the pancreas to maintain blood sugar levels. **Complex carbohydrates** are foods like bread, vegetables, rice, and fruit (fruit contains simple **and** complex carbohydrates). These carbohydrate types lead to a slower increase of blood sugar, making it easier for the pancreas to maintain blood sugar levels.

The management of diabetes involves better maintenance of blood sugar levels by doing the following:

- consume a diet that makes it easier for the pancreas to regulate blood sugar levels [consistent and high-quality (i.e., high-fiber) carbohydrate intake]
- engage in moderate physical activity to increase the body's use of insulin
- take medication prescribed by your doctor

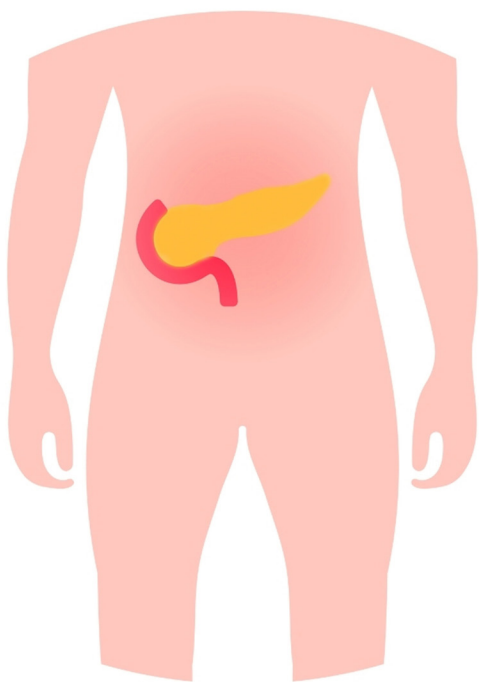


Figure 1. The pancreas (yellow organ) produces insulin, which helps the body to regulate blood sugar. Diabetes is a health condition characterized by ineffective insulin production and/or use, which leads to high blood sugar levels. High blood sugar is associated with damage to the eyes, kidneys, nerves, and blood vessels. With proper management and blood sugar control, however, individuals with diabetes can lead healthy lives.

It can be a challenging regimen, but the more you know about diabetes and the parameters of its management, the more doable it becomes to incorporate the needed changes. This bulletin helps you to understand more about what diabetes is, what you can do to prevent and/or manage it, and what prevention programs Idaho offers for those looking for more support. In addition, it briefly discusses the latest research being developed by Breakthrough T1D (formerly Junior Diabetes Research Foundation) to find type 1 diabetes cures.

What Is Type 1 Diabetes?

There are two types of diabetes, type 1 and type 2 (Figure 2). Type 1 typically afflicts children but can still develop later in life. In type 1 diabetes, the pancreas cannot make insulin because the immune system mistakenly attacks the body's own pancreas, specifically the cells that produce insulin there. This

makes type 1 diabetes an autoimmune disorder. Risk factors for type 1 diabetes include both genetic and environmental factors. Treatment usually involves following a consistent carbohydrate diet and using synthetic insulin to replace the insulin not being made by the damaged pancreas. There is currently no prevention or cure, only treatment and lifelong management; however, new research and advancements that include early detection, disease-modifying therapies, and cell therapies may slow or stop its progression.

What Is Type 2 Diabetes?

Type 2 diabetes is usually diagnosed later in life but has been on the rise in children since 2000 and can be linked to weight and lifestyle. It is the most common type of diabetes in the United States; over 1.2 million people over the age of eighteen were diagnosed with it in 2021. In type 2, the pancreas produces insulin, but the body is resistant to it, which creates high blood sugar levels. In more advanced cases, the strain of insulin resistance damages the pancreas, disabling it from making enough insulin. Type 2 is not an autoimmune disorder but rather a combination of the consequences of lifestyle factors and genetics. Risk factors for type 2 diabetes thus include obesity, an unhealthy diet, a sedentary lifestyle, genetics, and aging. Treatment includes maintaining a healthy diet with a balance of carbohydrate intake; moderate physical activity; and taking prescribed medications, like Metformin, which work in a variety of ways to decrease blood sugar levels. Weight loss is also an important strategy. If diagnosed early enough [for example, as **prediabetes** (chronic high blood sugar levels)], the progression of this condition can be prevented through lifestyle changes. Indeed, following the strategies provided by diabetes preventive programs can help individuals prevent the progression of prediabetes to type 2 diabetes.

Management and Prevention

Diabetes Self-Management Education and Support

The management and care of diabetes is complex and challenging, requiring daily management by individuals with diabetes and their caregivers. A

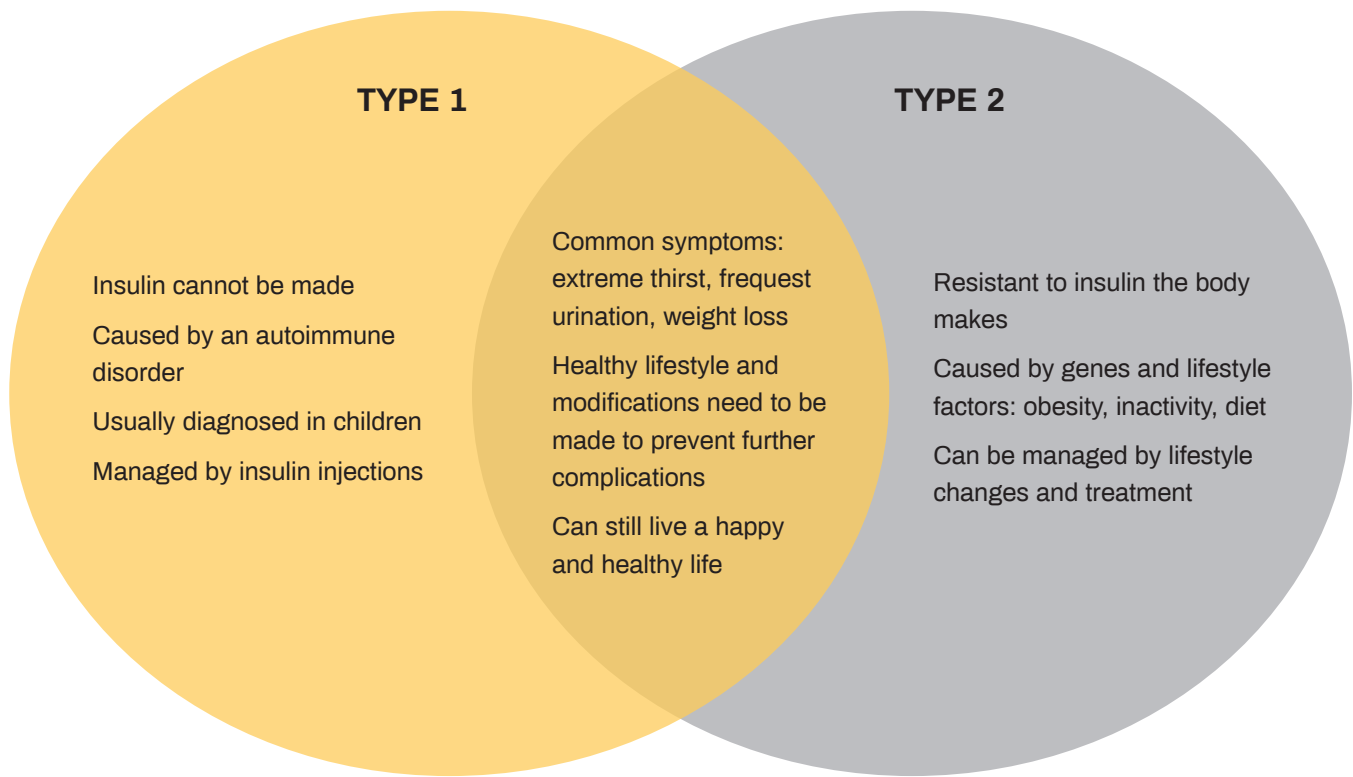


Figure 2. A Venn diagram comparing and contrasting the characteristics of Type 1 and Type 2 diabetes.

useful educational resource in this endeavor include programs created by Diabetes Self-Management Education and Support (DSMES), whose services help people with diabetes to assume responsibility for effective self-management. The programs began in the 1980s, when they transitioned from providing basic patient instruction to a more structured, evidenced-based approach. Initially, they were located in hospitals, but today new delivery settings include telehealth, which is crucial for reaching rural areas. Other recent developments include efforts to ensure insurance coverage by private health insurers and Medicaid. To find more information and a DSMES program in your area, visit the Association of Diabetes Care and Education Specialists website at www.adces.org.

Diabetes Prevention Programs

Over the last twenty-five years, diabetes and prediabetes has risen alarmingly in the United States. A 2023 Centers for Disease Control (CDC) Diabetes Statistics Report shows that an estimated 38.4 million Americans, or 11.3% of the US population, have

diabetes, and more than one out of three Americans have prediabetes, a total of 97.6 million people. In the midst of this outbreak, the CDC developed the National Diabetes Prevention Program (National DPP) in 2010, specifically targeting the incidence of type 2 diabetes.

The National DPP is a partnership of public and private organizations working together to deliver an evidence-based lifestyle change program to prevent or delay the onset of type 2 diabetes. Facilitated by a trained NDPP lifestyle coach, the group program is delivered in person, online, or through distance learning. Its curriculum focuses on helping people eat healthier, lose weight, increase physical activity, improve sleep, and reduce stress. The group-based structure builds support for individuals with prediabetes with regular interaction between the participants and coach. To find out more about the National DPP and a program in your area visit Find a “Lifestyle Change Program” at <https://www.cdc.gov/diabetes-prevention/lifestyle-change-program/find-a-program.html>.

New Technologies and Cutting-Edge Research

Monitoring and Screening

The tools and technology for monitoring diabetes have improved over the years, from urine and blood tests in doctor offices and self-monitoring of blood glucose (SMBG) in the 1980s to the introduction of the Continuous Glucose Monitor (CGM) in the 1990s and early 2000s. Still in use, the modern-day CGM is a wearable device that individuals swipe or flash to obtain a glucose reading and that tracks trend data over a period of time. Users connect a CGM to a smartphone and/or computer to download data for alerts, sharing tools, and treatment assessments. The most recent updates include hybrid closed-loop systems that automatically adjust insulin delivery based on CGM data. The innovation has transformed the management of diabetes, allowing for user-friendly self-monitoring of blood glucose levels.

Screening tests and tools for gauging diabetes control have also improved. First developed in the 1920s, the Oral Glucose Tolerance Test gained widespread use in the 1940s and 50s, followed by urine testing in the 1950s and 60s; today, A1C testing (developed in the 1970s) is a standard measure. In fact, the A1C test is a valuable tool for both diagnosing diabetes and assessing how individuals are managing the condition. The test measures a person's average blood sugar level over the past two to three months, rather than at the time of the test, the measure provided by the earlier tests. Thus, the A1C provides a more reliable assessment of long-term blood glucose status that more accurately assesses and diagnoses diabetes, as well as determines the best treatment options. Because of its efficacy, it continues to be used today in both healthcare and research settings for testing and gauging diabetes control.

The availability of so many accurate tools has spurred the health industry to step up prevention protocols. In particular, the American Diabetes Association (ADA) recommends the following:

- screening for all people starting at age thirty-five, for both prediabetes and diabetes

- earlier screening for individuals who are overweight or obese and have one or more risk factors
- retesting, specifically every three years for individuals with normal results and yearly for individuals with prediabetes
- risk-based screening for children and teens who are overweight/obese with one or more risk factors, starting after puberty (or age ten)

Because several diabetes testing methods are acceptable, check with your healthcare provider to determine which one is best for you. The CDC offers a free online prediabetes risk test at <https://www.cdc.gov/prediabetes/risktest/index.html>. Also visit the Centers's "Diabetes Risk Factors" page at <https://www.cdc.gov/diabetes/risk-factors/index.html> to find out more about diabetes risk factors.

Breakthrough Type 1 Diabetes (T1D)

Another outlet for diabetes research and screening is through Breakthrough T1D, the leading global type 1 diabetes research and advocacy organization. Its mission is to accelerate life-changing breakthroughs to cure, prevent, and treat type 1 diabetes (T1D) and its complications. The organization has two core objectives: 1) to cure T1D by restoring the body's ability to make insulin, stopping T1D before it occurs, and providing insulin independence; and 2) to improve lives by advancing innovative technologies, therapies, and resources. The main driver to achieve these goals involves ongoing research to develop insulin-producing cells.

Currently, no cure to restore insulin independence for people with T1D exists, but Breakthrough T1D scientists are concentrating on three research areas for its discovery: screening, cell therapies, and disease-modifying therapies. The intention with screening is to identify and support people at risk for T1D before disease onset. A simple blood test detects T1D autoantibodies, an established indicator of the risk of developing T1D. The screening and early detection have several benefits, including a reduced risk of diabetic ketoacidosis, a serious complication due to a shortage of insulin at diagnosis. Early detection also provides an individual with extra time to plan, prepare, and accelerate opportunities

to explore the latest research, disease-modifying therapies, or treatment options.

Cell therapies for T1D and T2D attempt to replace lost insulin-producing β cells with healthy new ones, thus protecting the cells from attack by a person's own immune system. The cell therapies for T1D include stem-cell-derived β -cells (Esc or iPSC), Islet transplantation from a donor, encapsulation devices, and immune-protective or modifying strategies such as gene-edited cells. The cell therapies for T2D are working to help the body use insulin better and protect cells that make insulin. Specific cell therapies for T2D include Mesenchymal Stem Cells (MSCs), Induced Pluripotent Stem Cells (iPSCs) and ESC-derived β -cells, Islet-like organoids and engineered cell clusters. The most-studied T2D cell therapy is MSCs, which calms inflammation, makes muscles and the liver respond better to insulin, and protects the pancreas. The cell therapies are not yet cures, but they are promising advances in finding cures for T1D and T2D.

Disease-modifying therapies for T1D that are being developed and researched by Breakthrough T1D and others seek to detect T1D in its initial stages to prevent or slow the destruction of insulin-producing beta cells. In November 2022, the first US Food and Drug Administration–approved immunotherapy drug, Teplizumab (Tziel), delays the onset of clinical T1D for a median of two years. The delay eliminates the daily challenges of blood glucose monitoring and insulin injections for months to years. It is a groundbreaking discovery, the first major treatment for T1D in over one hundred years since the discovery of insulin in 1921. Learn more about Breakthrough's various therapies and find more information on screening, detection, and treatments at www.breakthrough1d.org.

TrialNet

TrialNet (a network of healthcare providers and scientists established in 2000) also works at the frontline of T1D research, mostly by focusing on providing free risk screening to relatives of people with diabetes. Part of a study called Pathway to Prevention, the screening detects T1D in its earliest stage, whose data helps researchers learn more about how T1D progresses and to test the efficacy of

ways to maintain insulin production before and after diagnosis. Its data collection ultimately supports the study's overall goal to find a way to prevent T1D. A large network of providers that participate in this study exists throughout the United States, including sites in Idaho. To find out more about the study and screening information visit <https://www.trialnet.org/>.

Diabetes Can Be Prevented and Managed

Diabetes is a common condition affecting millions of Americans, including one in ten Idahoans. However, with lifestyle changes, such as healthy eating and improved physical activity patterns, as well as adopting new monitoring and disease-modifying treatments, residents can prevent and/or effectively manage the disease. University of Idaho Extension and other providers offer services such as the Diabetes Prevention Program to help those with prediabetes prevent the progression to type 2 diabetes. For more information about the University of Idaho Extension Diabetes Prevention Program contact Bridget Morrisroe at bridgeta@uidaho.edu or 208-287-5900.

Further Reading

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