Complete Diabetes Guide

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What is diabetes?

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood glucose (blood sugar levels).

In people with diabetes, glucose accumulates in the blood instead of being used as an energy source by cells, leading to chronic hyperglycemia that can damage many organ systems over

time.

Types of diabetes

Type 1 Diabetes

Characteristics:

- Autoimmune disease where the immune system destroys pancreatic beta cells
- Usually appears before age 30 (but can occur at any age)
- Requires lifelong insulin treatment
- Accounts for approximately 5-10% of diabetes cases

Cause: Autoimmune destruction of insulin-producing cells

Type 2 Diabetes

Characteristics:

- Most common form (90-95% of cases)
- Usually appears after age 40, but increasingly common in younger people
- Insulin resistance and/or decreased insulin production
- Often associated with overweight and obesity

Progression: May initially be managed with diet and exercise, then require medications

Gestational Diabetes

Characteristics:

- Appears during pregnancy
- Usually disappears after delivery
- Increases risk of developing type 2 diabetes later
- Requires close monitoring

Other Specific Types

- MODY (Maturity Onset Diabetes of the Young)
- Secondary diabetes (medications, pancreatic diseases)
- Neonatal diabetes

Causes and risk factors

Type 1 Diabetes

Risk factors:

- Genetic predisposition
- Environmental factors (viral infections, stress)
- Family history
- Certain autoimmune markers

Type 2 Diabetes

Modifiable risk factors:

- Overweight and obesity (especially abdominal)
- Sedentary lifestyle
- Unbalanced diet
- Smoking
- Chronic stress

Non-modifiable risk factors:

- Age (>45 years)
- Family history
- Ethnicity (African, Hispanic, Asian)
- History of gestational diabetes

- Polycystic ovary syndrome

Symptoms

Classic symptoms (hyperglycemia)

> **The "4 Ps" of diabetes:**
>
> - **Polyuria:** excessive urination
> - **Polydipsia:** intense thirst
> - **Polyphagia:** excessive hunger
> - **Weight loss:** unexplained weight loss

Other possible symptoms

- Fatigue and weakness
- Blurred vision
- Slow wound healing
- Recurrent infections (urinary, skin)
- Numbness or tingling
- Fruity breath odor (ketoacidosis)

Type-specific characteristics

- **Type 1:** Rapid onset and severe symptoms
- **Type 2:** Often insidious symptoms, sometimes asymptomatic

Diagnosis

Diagnostic criteria

Fasting plasma glucose:

- **Normal:** < 5.6 mmol/L (100 mg/dL)
- **Prediabetes:** 5.6-6.9 mmol/L (100-125 mg/dL)
- **Diabetes:** ≥ 7.0 mmol/L (126 mg/dL)

Oral glucose tolerance test (75g glucose):

- **Normal:** < 7.8 mmol/L (140 mg/dL) at 2 hours
- **Prediabetes:** 7.8-11.0 mmol/L (140-199 mg/dL) at 2 hours
- **Diabetes:** ≥ 11.1 mmol/L (200 mg/dL) at 2 hours

Glycated hemoglobin (HbA1c):

- **Normal:** < 5.7%
- **Prediabetes:** 5.7-6.4%
- **Diabetes:** ≥ 6.5%

Random plasma glucose:

- **Diabetes:** ≥ 11.1 mmol/L (200 mg/dL) with symptoms

Additional tests

- C-peptide (assessment of pancreatic function)
- Autoantibodies (GAD, IA-2, ZnT8) for type 1
- Lipid profile
- Kidney function
- Eye examination

Complications

Acute complications

Diabetic ketoacidosis (DKA): Medical Emergency

- More common in type 1
- Symptoms: nausea, vomiting, abdominal pain, fruity breath

Hyperosmolar hyperglycemic state:

- More common in type 2
- Severe dehydration
- Altered consciousness

Severe hypoglycemia:

- Risk with insulin and certain medications
- Symptoms: sweating, tremors, confusion, loss of consciousness

Chronic complications

Microvascular:

- **Diabetic retinopathy:** Leading cause of blindness in adults. Annual screening recommended. Stages: non-proliferative → proliferative.
- **Diabetic nephropathy:** Leading cause of end-stage renal disease. Monitoring: creatinine, microalbuminuria. Progression: normoalbuminuria → microalbuminuria → macroalbuminuria → kidney failure.
- **Diabetic neuropathy:** Peripheral nerve damage. Types: sensory, motor, autonomic. Complications: diabetic foot, digestive disorders, erectile dysfunction.

Macrovascular:

- Coronary artery disease (heart attack)

- Stroke
- Peripheral arterial disease
- Cardiovascular risk increased 2-4 fold

Treatment and management

Treatment goals

- **Glycemic targets:** HbA1c < 7% (adults with type 2 without comorbidities), < 7.5% (frail elderly), or < 6.5% (if achievable without hypoglycemia).
- **Other targets:** Blood pressure < 130/80 mmHg, LDL cholesterol < 1.8 g/L (diabetes + high CV risk), smoking cessation, healthy weight maintenance.

Type 1 Diabetes

- **Insulin therapy:** Basal-bolus regimen or insulin pump.
- **Hybrid closed-loop systems:** Glucose sensor + insulin pump for automatic adjustment.

Type 2 Diabetes

A progressive approach is used:

1. **Step 1:** Lifestyle modifications (diet, exercise, weight loss).
2. **Step 2:** Monotherapy (Metformin is first-line).
3. **Step 3:** Dual therapy (e.g., Metformin + another class).
4. **Step 4:** Triple therapy or insulin.

Drug classes

- **Metformin:** Decreases glucose production. No hypoglycemia risk.
- **Sulfonylureas:** Stimulate insulin secretion. Risk of hypoglycemia.
- **DPP-4 inhibitors:** Increase incretins. Weight neutral.
- **GLP-1 agonists:** Incretin mimetics. Promote weight loss and cardiovascular protection.

- **SGLT-2 inhibitors:** Decrease renal glucose reabsorption. Promote weight loss and cardio/renal protection.

Diet and diabetes

General principles

- **Energy distribution:** Carbohydrates (45-50%), Lipids (30-35%), Proteins (15-20%).
- **Qualitative recommendations:** Prefer complex carbs, limit simple sugars, favor fiber, and choose healthy fats.

Glycemic index and load

- **Glycemic Index (GI):** A measure of how food affects blood sugar. Prefer low GI foods (<55) like legumes and whole grains.
- **Glycemic Load (GL):** A more practical concept combining GI and carbohydrate amount.

Practical advice

- Structure meals: 3 main meals +/- snacks. Avoid grazing.
- Cooking techniques: Prefer steaming, grilling, baking. Limit frying.
- Label reading: Watch for hidden sugars and understand carbohydrate content.

Alcohol and diabetes

> **Risk of delayed hypoglycemia (up to 24 hours).** Always consume alcohol with food and monitor glucose closely. Consumption should be moderate.

Physical activity

Benefits of exercise

Improves insulin sensitivity, decreases blood glucose, aids weight control, reduces cardiovascular risk, and enhances psychological well-being.

Recommendations

- **Aerobic activity:** 150 minutes/week of moderate intensity or 75 minutes/week of vigorous intensity.
- **Resistance training:** 2-3 sessions/week targeting all major muscle groups.

Precautions

- Get a preliminary medical assessment.
- Adapt exercises based on complications (e.g., avoid jarring exercises with retinopathy).
- Pay close attention to foot care.
- Manage glucose by monitoring before, during, and after exercise, adjusting medication as needed, and staying hydrated.

Monitoring and self-care

Blood glucose self-monitoring

Systematic for Type 1 and recommended for Type 2 on insulin. Frequency varies but should be increased during illness, exercise, or other changes.

Glycemic targets:

- **Preprandial:** 4-7 mmol/L (72-126 mg/dL)
- **Postprandial:** < 10 mmol/L (180 mg/dL)
- **Bedtime:** 5-8 mmol/L (90-144 mg/dL)

Medical monitoring

Regular check-ups are crucial for managing diabetes and preventing complications.

- **Every 3-6 months:** HbA1c, weight, blood pressure, foot examination.

- **Annually:** Lipid profile, kidney function tests, eye examination, ECG, dental check-up.

Prevention

Primary prevention (type 2)

For high-risk individuals, effective measures include weight loss (5-10%), regular physical activity (150 min/week), a balanced diet, and smoking cessation.

Secondary prevention

Involves early screening in at-risk populations to detect diabetes before major symptoms appear.

Tertiary prevention

Focuses on preventing complications through optimal glycemic control, managing cardiovascular risk factors, regular monitoring, and patient education.

Vaccinations:

Annual flu, pneumococcus, COVID-19, and Hepatitis B vaccinations are recommended.

Living with diabetes

Patient education

The cornerstone of diabetes management. It empowers individuals with self-care skills to adapt their lifestyle, manage special situations, and improve quality of life.

Special situations

- **Travel:** Carry prescriptions, sufficient medication, and an emergency kit. Adjust for time zones.

- **Illness:** Maintain insulin, monitor glucose more frequently, stay hydrated, and consult a doctor if needed.
- **Surgery:** Inform the medical team for preoperative adjustments and monitoring.

Psychosocial aspects

It's normal to experience denial, anxiety, or frustration. Psychological support from professionals, family, friends, and support groups is vital.

Diabetes and employment

Employees are protected against discrimination. Accommodations may be possible. Certain safety-sensitive positions may have restrictions.

Diabetes and pregnancy

Requires preconception planning for optimal glycemic control and close monitoring throughout pregnancy by a specialized team.

Resources and support

Patient associations

Organizations like the American Diabetes Association, JDRF, and Diabetes UK offer information, support groups, and advocacy.

Healthcare professionals

A multidisciplinary team is key, including a primary care physician, diabetologist, dietitian, diabetes educator, podiatrist, and ophthalmologist.

Tools and applications

Mobile apps can help with logging glucose, counting carbs, and medication reminders. Use reliable websites from official associations and medical portals for information.

Conclusion

Diabetes is a chronic disease that requires comprehensive and personalized management. With appropriate treatment, regular monitoring, and adoption of a healthy lifestyle, it is possible to live normally with diabetes and prevent complications.

Patient education, family support, and guidance from a competent medical team are the keys to successful diabetes management.

Key points to remember:

- Diabetes can be controlled but not cured.
- The goal is to maintain normal blood glucose.
- Complication prevention is paramount.
- Patient education is essential.
- Psychosocial support is important.
- Therapeutic advances offer new hope.

This guide is for informational purposes and does not replace medical advice. Always consult your healthcare team for personalized care.