



# Diabetes for CNAs

**This course has been awarded  
two (2.0) contact hours.**

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## **Acknowledgements**

...**The National Institutes of Health's National Institute on Aging (NIA)**. The NIA has within it a specific section dedicated to various health issues and maintains current information on diabetes.

...**The National Institute of Health's National Diabetes Information Clearinghouse** maintains information for patients and professionals about diabetes.

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...**Karen Siroky RN, MSN**, updated this course in 2008.

## Purpose and Objectives

The purpose of this course is to introduce the learner to the disease of diabetes, its causes, treatments, and effects.

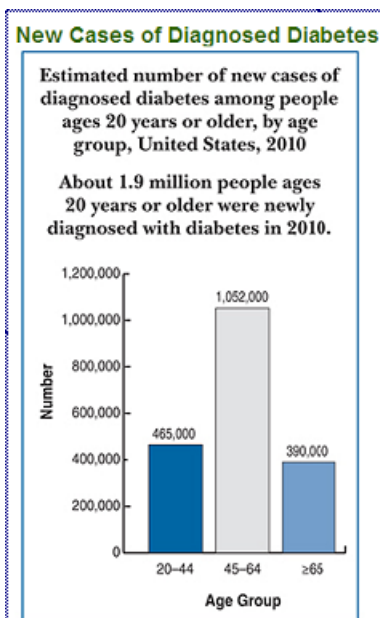
**After successful completion of this course, you will be able to:**

1. Define diabetes and its three main types.
2. Outline who is more likely to develop diabetes.
3. Recognize the risk factors for diabetes.
4. Explain how diabetes is diagnosed.
5. Discuss the management of diabetes.
6. Identify key complications of diabetes.

## Introduction

Almost everyone knows someone who has diabetes. An estimated 25.8 million people in the United States have diabetes (NIH, 2011a). This works out to approximately 8 percent of the population.

Diabetes is a serious, lifelong condition. In 2011, about 18 million people were diagnosed with diabetes (NIH, 2011a).



Source: 2007-2009 National Health Interview Survey estimates projected to the year of 2010

## What is Diabetes?

Diabetes is a disorder of metabolism—the way our bodies use digested food for growth and energy. Most of the food we eat is broken down into glucose, a form of sugar in the blood. Glucose is the main source of fuel for the body.

After digestion, glucose passes into the bloodstream, where it is used by cells for growth and energy. For glucose to get into cells, insulin must be present. Insulin is a hormone produced by the pancreas, a large gland behind the stomach.

When we eat, the pancreas automatically produces insulin to move glucose from blood into our cells. The pancreas in people with diabetes produces little or no insulin, or the cells do not respond appropriately to the insulin. Glucose builds up in the blood and overflows into the urine. The body loses its main source of fuel.

### True or False?

**The body cannot use glucose for fuel without insulin.**

**True!**

**Insulin allows glucose to enter the cells from the blood.**

### **What are the Scope and Impact of Diabetes?**

Diabetes is widely recognized as one of the leading causes of death and disability in the United States. In 2011, it was the seventh leading cause of death (NIH, 2011a). However, diabetes is likely to be under-reported as the cause of death on death certificates.

Diabetes is associated with many long-term complications. The disease often leads to blindness, heart and blood vessel disease, stroke, kidney failure, amputations, and nerve damage. Uncontrolled diabetes can complicate pregnancy, and birth defects are more common in babies born to women with diabetes.

**True or False?**

**Diabetes is a major cause of death and disability.**

**True!**

**Long-term complications of diabetes include blindness, heart disease, stroke, kidney failure, amputations, and nerve damage.**

### **Why is Diabetes on the Rise?**

The frequency of diabetes in the United States is likely to increase for several reasons.

First, a large segment of the population is aging. Also, Americans are becoming increasingly more overweight and inactive.

According to 2011 estimates from the Centers for Disease Control and Prevention (CDC), about 1.9 million people aged 20 years or older were newly diagnosed with diabetes in 2010.

Diabetes will affect one in three people born in 2000 in the United States.

**True or False?**

**More people are developing diabetes now because they are taking more medications.**

**False!**

**Diabetes is increasing because the population is becoming older and more obese.**

### **Understanding Blood Glucose Levels**

Everyone's blood has some glucose in it. With people who do not have diabetes, the normal blood glucose range is between 70 - 120 mg/dL.

Blood glucose goes up after eating, but returns to normal levels one to two hours after eating.

**By measuring fasting blood glucose levels, we can identify patients at risk for diabetes.**

### **Pre-Diabetes or Impaired Fasting Glucose**

People with pre-diabetes have blood glucose levels that are higher than normal but not high enough for a diagnosis of diabetes. Pre-diabetes is becoming more common in the United States. Many people with pre-diabetes go on to develop type 2 diabetes within 10 years.

Pre-diabetes raises the risk of developing type 2 diabetes, heart disease, and stroke. People with pre-diabetes can reduce the risk of developing diabetes by losing weight and increasing daily exercise.

Pre-diabetes is also called impaired fasting glucose (IFG) or impaired glucose tolerance (IGT), depending on the test used to diagnose it.

Some people have both IFG and IGT:

- IFG is a condition in which the blood glucose level is high (100 to 125 mg/dL) after an overnight fast, but is not high enough to be classified as diabetes.
- IGT is a condition in which the blood glucose level is high (140 to 199 mg/dL) after a 2-hour oral glucose tolerance test, but is not high enough to be classified as diabetes.

## What are the Types of Diabetes?

The three main types of diabetes are:

- Type 1 diabetes
- Type 2 diabetes
- Gestational diabetes

**Type 1 diabetes is also known as insulin-dependent diabetes or juvenile diabetes as it is often first diagnosed during childhood.**

**Type 2 diabetes is also known as adult-onset diabetes or non insulin-dependent diabetes.**

**Gestational diabetes occurs during pregnancy.**

### Type 1 Diabetes

Type 1 diabetes is an autoimmune disease. An autoimmune disease results when the body's system for fighting infection (the immune system) turns against a part of the body. In type 1 diabetes, the immune system attacks and destroys the insulin-producing cells in the pancreas, and patients must take insulin to live.

Type 1 diabetes develops most often in children and young adults but can appear at any age. Symptoms of type 1 diabetes usually develop over a short period.

Symptoms may include:

- Increased thirst and urination
- Constant hunger
- Weight loss
- Blurred vision
- Extreme fatigue

If a person with type 1 diabetes is not diagnosed and treated with insulin, they can lapse into a life-threatening diabetic coma, also known as diabetic ketoacidosis.

### Type 2 Diabetes

The most common form of diabetes is type 2 diabetes. People can develop type 2 diabetes at any age, even during childhood but it is more common in older adults. Most people with type 2 diabetes are overweight. Type 2 diabetes is also associated with:

- Older age
- Obesity
- Family history of diabetes
- Physical inactivity
- History of diabetes in pregnancy (gestational diabetes)
- Certain ethnic groups (for example, Native American)

When type 2 diabetes is diagnosed, the pancreas is usually producing enough insulin, but for unknown reasons the body cannot use the insulin effectively. This is a condition called insulin resistance.

### **Did You Know?**

**Being overweight and inactive increases the chances of developing type 2 diabetes.**

### **Type 2 Diabetes Cont.**

Over time, after several years, insulin production decreases. The result is the same as for Type 1 diabetes; glucose builds up in the blood and the body cannot make efficient use of its main source of fuel.

The symptoms of type 2 diabetes develop gradually. Symptoms do not appear as suddenly as they do in type 1 diabetes.

Symptoms may include:

- Fatigue
- Frequent urination
- Increased thirst and hunger
- Weight loss
- Blurred vision
- Slow healing of wounds or sores

Some people have no symptoms.

### **Gestational Diabetes**

Some women develop gestational diabetes late in pregnancy. This form of diabetes usually disappears after the birth of the baby. However, women who have gestational diabetes will be at an increased risk for developing type 2 diabetes within 5 to 10 years.

Gestational diabetes is caused by the hormones of pregnancy or a shortage of insulin. Women with gestational diabetes may not experience any symptoms.

About 2 to 10 percent of pregnant women in the United States develop gestational diabetes (NIH, 2011a).

As with type 2 diabetes, gestational diabetes occurs more often in some ethnic groups and among women with a family history of diabetes.

### **Who Gets Diabetes?**

Diabetes is not contagious. People cannot "catch" it from each other. However, certain factors can increase the risk of developing diabetes.

Type 1 diabetes occurs equally among males and females but is more common in whites than in non-whites.

Data has shown that type 1 diabetes is rare in most African, American Indian, and Asian populations. However, some northern European countries, including Finland and Sweden, have high rates of type 1 diabetes. The reasons for these differences are unknown. Type 1 diabetes develops most often in children but can occur at any age.

Type 2 diabetes is more common in older people, especially in people who are overweight, and occurs more often in African Americans, American Indians, some Asian Americans, Native Hawaiians and other Pacific Islander Americans, and Hispanics/Latinos.

### **How is Diabetes Diagnosed?**

The fasting blood glucose test is the preferred test for diagnosing diabetes in children and non pregnant adults. It is most reliable when done in the morning.

However, a diagnosis of diabetes can be made based on any of the following test results:

- A blood glucose level of 126 milligrams per deciliter (mg/dL) or greater after an 8-hour fast (the fasting blood glucose test).
- A blood glucose level of 200 mg/dL or greater 2 hours after drinking a beverage containing 75 grams of glucose dissolved in water. This test is called the oral glucose tolerance test (OGTT).
- A random (taken at any time of day) blood glucose level of 200 mg/dL or greater, along with the presence of diabetes symptoms.

#### **True or False?**

**Diabetes can be diagnosed without the presence of symptoms.**

#### **True!**

**Blood tests can diagnose diabetes, even in people who report no symptoms.**

#### **Did You Know?**

**The guidelines for diagnosing gestational diabetes differ; as women have lower glucose levels in pregnancy.**

### **The A1C Test**

The A1C test is a blood test that shows the average amount of glucose in the blood during the past 2 to 3 months. The A1C test, together with the blood glucose test can be used to ensure that the patient's blood glucose is under control.

The A1C test is usually done at least twice a year. If the A1C result is not on target, the health care provider may do this test more often to see if the result improves as treatment changes.

If the patient's A1C test result is on target, then it means that the blood glucose is in a desirable range, and the diabetes treatment plan is working. The lower the A1C is, the lower the risk of having health problems.

If the A1C result is too high, the patient may need a change in their diabetes plan. This may entail changing meal plans, diabetes medicines, or altering physical activity.

**The A1C target for most people with diabetes is below 7%.  
(NIH, 2011)**

### **Goal of Diabetes Management**

The goal of diabetes management is to keep levels of blood glucose, blood pressure, and cholesterol as close to the normal range as safely possible.

Research studies show that keeping blood glucose levels close to normal reduces the risk of developing major complications of diabetes.

### **Managing Diabetes**

Managing diabetes is more than keeping blood glucose levels under control; it is also important to manage blood pressure and cholesterol levels through healthy eating, physical activity, and the use of medications (if needed). By doing so, those with diabetes can lower their risk.

People with diabetes must take responsibility for their day-to-day care. Much of the daily care involves keeping blood glucose levels from going too low or too high.

When blood glucose levels drop too low (a condition known as hypoglycemia), a person can become nervous, shaky, and confused. Judgment can be impaired, and if blood glucose falls too low, fainting can occur.

A person can also become ill if blood glucose levels rise too high, a condition known as hyperglycemia.

**CNAs play an important role in educating patients to follow a healthy lifestyle to reduce the risk of developing diabetes.**

### Treating Diabetes

Insulin therapy is the basis of management in patients with type 1 diabetes. There are many different types of insulin that must be administered at different times, depending on how quickly they act. The amount of insulin must be balanced with food intake and daily activities.

Blood glucose levels must be closely monitored through frequent blood glucose checking. People with diabetes also monitor blood glucose levels several times a year with the A1C laboratory test, which reflects average blood glucose over a 2- to 3-month period.

Healthy eating, physical activity, and blood glucose testing are the basic management tools for type 2 diabetes. In addition, many people with type 2 diabetes require oral medication, insulin, or both to control their blood glucose levels.

### Complications of Diabetes

Adults with diabetes are at high risk for developing:

- Cardiovascular disease (CVD)
- Stroke
- Kidney failure
- Nerve damage

Lowering cholesterol and blood fat levels will help prevent heart disease and stroke, the biggest health problems for people with diabetes. Keeping cholesterol levels under control can also help with blood flow. Meal planning, physical activity and medicines can help patients reduce the complications of diabetes.

Smoking and diabetes are a dangerous combination. Smoking interferes with blood circulation and raises the risk for diabetes problems. Try to encourage diabetics to stop smoking, as this can lower their risk for heart attack, stroke, nerve disease, and kidney disease.

**Regular monitoring of blood pressure, blood glucose levels, cholesterol and triglyceride (blood fats) levels are an important component of diabetic care.**

### Diabetes Management Teams

People with diabetes should see a healthcare provider who will help them learn to manage their diabetes and who will monitor their diabetes control. Most people with diabetes get care from primary care physicians: internists, family practice doctors, or pediatricians. Often, having a team of providers can improve diabetes care.

A team can include:

- A primary care provider such as an internist, a family practice doctor, or a pediatrician.
- An endocrinologist (a specialist in diabetes care).
- A dietitian, a nurse, and other healthcare providers who are Certified Diabetes Educators. These educators are experts in providing information about managing diabetes.
- A podiatrist (for foot care).
- An ophthalmologist or an optometrist (for eye care).
- Other healthcare providers, such as cardiologists and other specialists.

## Gestational Diabetes Management Teams

In addition, the team for a pregnant woman with type 1, type 2, or gestational diabetes should include an obstetrician who specializes in caring for women with diabetes.

The team can also include a pediatrician or a neonatologist with experience taking care of babies born to women with diabetes.

## Nursing Issues

If you have a patient with diabetes, the registered or licensed nurse will be responsible for insulin or medication management. The CNA plays an important role in monitoring the patient for signs that may indicate problems are occurring.

CNAs can also remember the following key points:

- Make sure your diabetic patient receives their tray on time and that the correct diet is delivered.
- Monitor your patient for signs of too much or too little insulin.
- Foot care in the diabetic patient is critical.
- Do not cut the toenails of a diabetic patient unless under the Policy & Procedure of your facility.
- Teach your diabetic patient not to go barefoot.

## Hope Through Research

Advances in diabetes research have led to better ways of managing diabetes and treating its complications. Major advances include:

- Development of quick-acting, long-acting, and inhaled insulin.
- Teaching people with diabetes to check their own blood glucose levels.
- Development of insulin pumps that deliver insulin, replacing daily injections.
- Laser treatment for diabetic eye disease, reducing the risk of blindness.
- Successful kidney and pancreas transplantation in people whose kidneys fail because of diabetes.
- Better ways of managing diabetes in pregnant women.
- New drugs that allow for better management of blood glucose reduces and may prevent development of diabetes complications.
- Two antihypertensive drugs, ACE (angiotensin-converting enzyme) inhibitors and ARBs (angiotensin receptor blockers) are more effective than other drugs in protecting kidney function in people with diabetes.
- Advances in transplantation of islets (clusters of cells that produce insulin and other hormones) for type 1 diabetes.
- Evidence that people at high risk for type 2 diabetes can lower their chances of developing the disease through diet, weight loss, and physical activity.

### **True or False?**

**Complications of diabetes can be significantly reduced by blood glucose control.**

**True!**

**Research shows that diabetes management strategies work.**

## What Will the Future Bring?

Researchers continue to look for the cause or causes of diabetes and ways to manage, prevent, or cure the disorder.



Scientists are searching for genes that may be involved in type 1 or type 2 diabetes. Some genetic markers for type 1 diabetes have been identified, and it is now possible to screen relatives of people with type 1 diabetes to determine whether they are at risk.

## Conclusion

Diabetes can be a debilitating and deadly disease. Although it cannot be cured, it can be managed to allow patients to enjoy a longer life.

The CNA can educate a diabetic patient about healthy lifestyle choices, the importance of regular monitoring of blood glucose levels and compliance with treatment plans.

To deliver the best possible care, CNAs must stay current with new developments in diabetes management.

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