



# Diabetes and TZDs (Thiazolidinediones)

## WHAT IS TYPE 2 DIABETES?

When you have type 2 diabetes, your blood glucose (sugar) levels are higher than normal. Blood glucose comes mainly from the food you eat, and some is produced by your liver. Your body uses glucose for energy with the help of insulin, a hormone made by your pancreas. You can develop type 2 diabetes when your body

- Doesn't make enough insulin
- Doesn't use insulin the way it should, a condition called insulin resistance

Most people with type 2 diabetes have both problems.

High blood glucose levels over time can lead to serious health problems, such as blindness, nerve damage, kidney disease, heart attacks, and strokes. But keeping blood glucose, blood pressure, and cholesterol levels on target with meal planning, exercise, and medicines (if needed) can prevent or delay these problems.

## DID YOU KNOW?

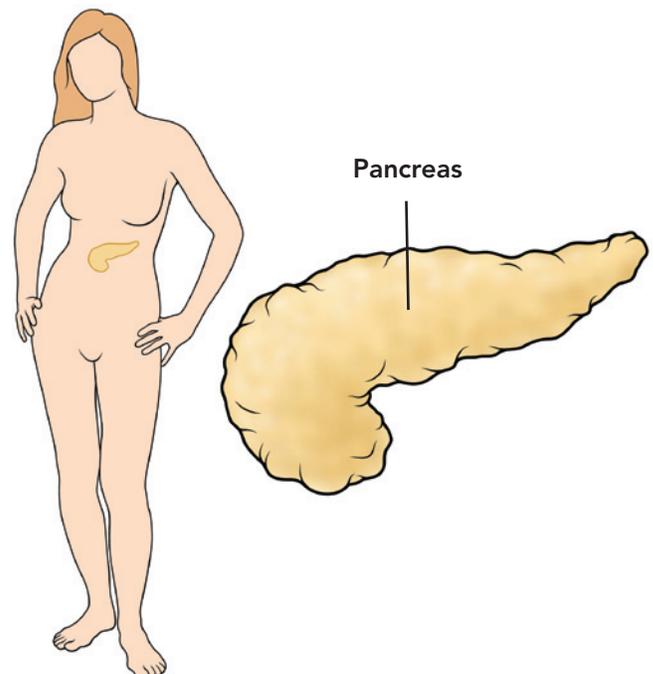
**Middle-aged and older people are more likely to develop type 2 diabetes. So are people who are overweight (especially around the waist) and physically inactive.**

## WHAT ARE TZDS?

TZDs, also called thiazolidinediones or "glitazones," are a type of pill for type 2 diabetes. The generic names are

- Pioglitazone (used most often)
- Rosiglitazone (rarely used)

TZDs help keep your blood glucose levels on target by decreasing insulin resistance and making body tissues more sensitive to insulin's effects. Then glucose can enter your cells where it is needed. TZDs also cut down on the amount of glucose made by your liver, which can be far too much in people with type 2 diabetes.



Several other types of diabetes pills are available. Each type works in a different way. Rarely you might take a TZD as your only diabetes medicine but most often you take it with another type of diabetes pill, such as metformin or a sulfonylurea. Some people take combination pills that contain a TZD plus another type of diabetes medicine.

## WHAT ARE THE POTENTIAL BENEFITS OF TZDS?

TZDs can

- **Keep blood glucose levels on target without causing low blood glucose (hypoglycemia).** Your risk for low blood glucose rises if you also take other diabetes medicines that can cause low blood glucose, such as a sulfonylurea or insulin.
- **Provide longer-lasting effectiveness.** Many people with type 2 diabetes find that after several years of taking diabetes pills, the pills are not enough to keep blood glucose levels on target. TZDs might help your body control blood glucose levels for a longer time compared with other diabetes pills.
- **Raise HDL (“good”) cholesterol levels slightly.** HDL cholesterol helps keep your blood vessels from getting blocked by removing harmful deposits.
- **Lower blood pressure slightly,** helping to prevent heart and blood vessel problems.
- **Reduce fat in the liver,** perhaps reversing fatty liver disease.

## HOW TZDS AFFECT YOUR RISK FOR A HEART ATTACK OR A STROKE

People with diabetes are at high risk for heart attacks and strokes. Researchers have studied the effects of TZDs. Some studies suggest that pioglitazone might lower your risk for a heart attack or a stroke. A few controversial studies suggest that rosiglitazone increases the risk of heart attacks, but other studies have not proven this. Still, rosiglitazone is no longer available in much of the world. In the U.S., it can only be prescribed to people who cannot take other diabetes pills.

## WHAT ARE THE POTENTIAL RISKS OF TZDS?

TZDs can

- **Raise the risk of congestive heart failure (CHF).** CHF is a serious condition in which your heart can’t pump blood properly to other parts of your body. Then fluid builds up in your legs, ankles, and lungs, making it hard to breathe. If you already have CHF, taking a TZD can make it worse.
- **Cause weight gain**—an average of about 6 to 9 pounds.

- **Increase fluid retention and swelling,** also called edema.
- **Increase the risk of broken bones,** particularly in hands, arms, and feet.
- **Raise the risk of anemia slightly.**
- **Increase the chances of getting pregnant** in women who don’t have regular periods.
- **Decrease the effectiveness of birth control pills** (pioglitazone only).

Some studies suggest that pioglitazone may increase the risk of bladder cancer, but this has not been proven. Even if a risk exists, it is very small. This is usually not an issue unless you have a personal or family history of bladder cancer.

If you have type 2 diabetes and want to find out if TZDs might be right for you, talk with your doctor.

## Questions to ask your doctor

- **What kind of medicine do I need for my diabetes?**
- **What are the risks and benefits of the medicine?**
- **How often will I need check-ups?**
- **What else can I do to stay healthy?**
- **Should I see a diabetes educator?**
- **Should I see an endocrinologist for my care?**

## RESOURCES

- Find-an-Endocrinologist: [www.hormone.org](http://www.hormone.org) or call 1-800-HORMONE (1-800-467-6663)
- Find a diabetes educator (American Association of Diabetes Educators): [www.diabeteseducator.org/DiabetesEducation/Find.html](http://www.diabeteseducator.org/DiabetesEducation/Find.html)
- Hormone Health Network diabetes information: [www.hormone.org/diabetes](http://www.hormone.org/diabetes)
- National Diabetes Information Clearinghouse (National Institutes of Health–NIH): [diabetes.niddk.nih.gov/](http://diabetes.niddk.nih.gov/)
- National Diabetes Education Program (NIH): [www.ndep.nih.gov](http://www.ndep.nih.gov)
- The American Diabetes Association: [www.diabetes.org](http://www.diabetes.org) (search for “consumer guide,” then “diabetes medications”)
- Mayo Clinic: [www.mayoclinic.com/health/diabetes-treatment/DA00089](http://www.mayoclinic.com/health/diabetes-treatment/DA00089)

## EDITORS

Silvio Inzucchi, MD  
Lawrence A. Leiter, MD  
Julio Rosenstock, MD

April 2012, 2nd Edition

The Hormone Health Network offers free, online resources based on the most advanced clinical and scientific knowledge from The Endocrine Society ([www.endo-society.org](http://www.endo-society.org)). The Network’s goal is to move patients from educated to engaged, from informed to active partners in their health care. This fact sheet is also available in Spanish at [www.hormone.org/Spanish](http://www.hormone.org/Spanish).

**Type 2 Diabetes and TZDs (Thiazolidinediones) Fact Sheet**



[www.hormone.org](http://www.hormone.org)