

# NIH News in Health

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## Preventing Type 2 Diabetes Steps Toward a Healthier Life

People with diabetes have a problem with blood sugar. Their blood sugar, or blood glucose, can climb too high. Having high levels of sugar in your blood can cause a lot of trouble. Diabetes raises your risk for heart disease, blindness, amputations, and other serious issues. But the most common type of diabetes, called type 2 diabetes, can be prevented or delayed if you know what steps to take.

About 29 million Americans, or nearly 1 in 10 people, have diabetes. Many more have a condition called **prediabetes**. People with prediabetes usually have no symptoms, yet they're at risk for eventually developing type 2 diabetes, heart disease, and stroke.

Research shows that you can greatly reduce your risk for type 2 diabetes and prediabetes by eating a healthy diet, getting plenty of physical activity, and losing excess weight.

Type 2 diabetes arises because of problems related to a **hormone** called insulin. When our bodies digest the foods we eat, they're broken down and converted to glucose and other molecules, which then travel



through the bloodstream. Insulin signals cells to let glucose in for use as an energy source. When a person has type 2 diabetes, either the body's cells have trouble using insulin, or the body isn't producing enough insulin. As a result, glucose can build up to harmful levels in the blood.

Type 2 diabetes occurs most often in people who are middle-aged or older, but younger people can get it too. "Before the mid- to late-1990s, we almost never saw type 2 diabetes in youth," says Dr. Barbara Linder, an NIH expert on childhood diabetes. But now, type 2 diabetes is becoming more common in young people, alongside increasing rates of childhood obesity.

Some factors that raise people's risk for type 2 diabetes are beyond their control. Having an immediate family member with diabetes increases your

risk. Type 2 diabetes is also more common in some races or ethnicities, including African-Americans, Alaska Natives, American Indians, Asian-Americans, Pacific Islanders, and Hispanic/Latinos.

People who are overweight, obese, or inactive are also much likelier to develop type 2 diabetes. But these are risk factors that you can change, and doing so will greatly reduce your risk for diabetes.

To understand how weight loss might affect diabetes risk, NIH launched a study in the early 1990s called the Diabetes Prevention Program. Doctors already knew that being overweight or obese was a risk factor for diabetes, but they didn't know if losing weight would reduce that risk.

The study enrolled more than 3,000 people who were overweight and had prediabetes. They were randomly assigned to different groups.

One group met regularly with study staff to focus on healthy behaviors, such as eating fewer calories and exercising more; they aimed to lose at least 7% of their body weight and to do at least 150 minutes of physical activity per week. Another group received metformin, a drug commonly used to treat type 2 diabetes, along

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### Definitions

#### Prediabetes

A condition in which blood sugar is higher than normal, but not high enough to be called type 2 diabetes.

#### Hormone

A substance produced in one part of the body to signal another part to react a certain way.

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with standard advice on diet and exercise. A control group received standard advice and an inactive placebo pill, which had no drug effects.

After an average of around 3 years, the researchers found that diabetes risk dropped by 58% in the group encouraged to make healthy lifestyle changes. About 38% in that group had achieved and maintained their weight loss goals and 58% their



### Wise Choices Take Steps To Prevent Diabetes

- **Move more.** Walk, dance, or ride a bike with your friends or family. It doesn't matter what activity you do, as long as you enjoy it.
- **Choose healthy foods.** Eat fiber-rich fruits and vegetables.
- **Maintain a healthy weight.** With healthy eating and more physical activity, you can drop pounds and keep them off.
- **Set reasonable goals.** Start with small changes, like being active for 15 minutes a day this week. Add 5 minutes per day each week until you're up to at least 30 minutes, 5 days a week.
- **Record your progress.** Keep a diary of what you eat and drink and the number of minutes you exercise. It's a great way to stay focused and reach your goals.
- **Keep at it.** Making even small changes is hard in the beginning. If you get off track, start again.

physical activity goals. The group taking metformin was also less likely to develop diabetes; their risk dropped by 31% compared to the control group.

In a follow-up study, both lifestyle changes and metformin continued to reduce the risk of developing diabetes, although their effects declined. After 10 years, people who continued with lifestyle changes delayed diabetes by about 4 years compared to people in the control group. People who continued to take metformin delayed diabetes by about 2 years.

Metformin has long been used and approved for treating type 2 diabetes. However, the U.S. Food and Drug Administration hasn't approved the drug for preventing type 2 diabetes. Research suggests that the drug's preventive effects may work best in younger and heavier people. For older people, lifestyle changes were especially helpful; they lowered diabetes risk by 71%.

"Weight loss is key, and physical activity is very important, but lifestyle changes are never easy," says NIH's Joanne Gallivan, director of the National Diabetes Education Program (<http://ndep.nih.gov>). The program offers resources to help with weight loss, healthy eating, and physical activity. Specific tips are provided for certain groups of people, such as children and older adults. Most materials are offered in Spanish, and some are available in other languages.

As the Diabetes Prevention Program showed, diet and exercise can reduce the risk of developing type 2 diabetes. You're most likely to suc-



### Web Links

For more information about preventing type 2 diabetes, click the "Links" tab at: <http://newsinhealth.nih.gov/issue/Nov2014/Feature1>

ceed at weight loss, Linder says, "if you can find some physical activity that you enjoy and can do every day."

To lose weight, you need to burn more calories than you consume. Participants in the Diabetes Prevention Program followed a low-fat, low-calorie diet. Experts now recognize that different people may need different diets. "If you're eating a lot of fat, that's what you need to cut out. If you're eating a lot of candy, then that's what you need to cut," Linder says. "You have to individualize it."

Experts recommend that people at risk for type 2 diabetes should exercise weekly at moderate intensity for 150 minutes. That's 30 minutes, 5 times a week.

"Get your heart rate up a bit. Work up a mild sweat," says Harvard's Dr. David Nathan, who leads the Diabetes Prevention Program studies. The training program used in the study is now widely available; for instance, the YMCA now offers a program based on the study.

If you think you might have prediabetes or diabetes, your doctor can help you decide what to do. A blood test called the A1C test can check your average blood glucose level to see if you have prediabetes.

Nathan says that people over 45 should be screened for diabetes, as should other people at increased risk. Risk factors and warning signs for type 2 diabetes include high blood pressure, high cholesterol, or a history of gestational diabetes or cardiovascular disease.

In 2012, 1.7 million Americans ages 20 and older were newly diagnosed with diabetes. "That's not good, but it's actually less than the 1.9 million new cases we had in 2010," Nathan says. "It may just be that we are turning the corner a little bit." ■

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# Parkinson's Disease

## Understanding a Complicated Condition

We rely on our brains for every movement we make, whether writing, walking, talking, or even sleeping. But a serious brain disorder like Parkinson's disease can rob a person of the ability to do everyday tasks that many of us take for granted. There's no cure, but treatment can help. And researchers continue to seek new understanding to improve medical care.

Parkinson's disease evolves gradually over time. The early signs may be barely noticeable. A person's movements may change slightly. You might notice slowness, rigidity, or difficulty balancing or walking. The person's face may lack expression, or handwriting may become small and cramped. Eventually, these changes can become more severe and interfere with daily life. It might become harder to sleep, think, eat, speak, smell, and make decisions. As the disease worsens, symptoms may become difficult to control.

Parkinson's disease usually arises after age 50, but can also appear earlier in life. It affects about 600,000

people nationwide. As Americans age, the number of people with Parkinson's disease is expected to rise dramatically.

Parkinson's disease is a neurodegenerative disorder, which means that brain cells gradually malfunction and die. The disease damages brain cells that make a chemical called **dopamine**. The resulting dopamine shortage causes the movement problems that mark Parkinson's disease.

Although researchers don't yet understand what causes Parkinson's disease, the body's **genes** likely play some role. A number of genes have been linked to the risk of developing Parkinson's. "Diving deeper into the genetics of the disease is providing us with hints about the underlying biology," says Dr. Beth-Anne Sieber, an NIH expert on Parkinson's disease.

But genes are only part of the picture. NIH-funded scientists are searching for other factors that might lead to the disease. One goal of this research is to discover new targets for drugs that can slow disease progression.

If you notice any of the common signs of Parkinson's disease, see a health care provider. Your doctor may refer you to a neurologist, a physician specializing in the nervous system. A careful exam and certain tests can help with diagnosis.

To treat Parkinson's, doctors prescribe combinations of medicines that work to regulate dopamine in the brain. "This helps free up people



to move better and lessens the troubling movement problems of Parkinson's," Sieber says.

A surgical procedure called deep brain stimulation is an option for some patients. In this approach, a small pacemaker-like system is placed in areas of the brain that control movement.

Research suggests that eating right and exercising may help reduce or delay symptoms. Scientists are studying how much and what kinds of exercise can most help improve patient health and quality of life.

Many potential new treatments for Parkinson's disease are now being studied in NIH-funded clinical trials. "There's a great need for people with Parkinson's and their families to participate in clinical research," says Sieber. "Participation is key."

To learn more about participating in NIH research on Parkinson's disease, or to find a clinical trial, visit [www.nih.gov/health/clinicaltrials](http://www.nih.gov/health/clinicaltrials). ■



### Wise Choices

#### Know the Signs of Parkinson's Disease

Parkinson's disease affects everyone differently. Common symptoms include:

- Movement problems such as shaking or tremor, especially in the fingers, hand, arm, or face
- Rigidity, stiffness, or slowness
- Fatigue or problems sleeping
- Problems standing or balancing
- Trouble speaking or choosing words
- Changes in handwriting
- Difficulty completing simple tasks or making decisions
- Inability to detect odors



### Definitions

#### Dopamine

A brain chemical that regulates movement, motivation, and other functions.

#### Genes

Stretches of DNA, a substance you inherit from your parents, that define characteristics such as eye color and your risk for certain diseases.



### Web Links

For more about Parkinson's disease, click the "Links" tab at: <http://newsinhealth.nih.gov/issue/Nov2014/Feature2>



# Health Capsules

For links to more information, see these stories online:  
<http://newsinhealth.nih.gov/issue/Nov2014/Capsule1>

## Progress Toward a Bird Flu Vaccine

An experimental bird flu vaccine triggered a powerful immune response in more than half of the volunteers who received it. The approach might lead to better vaccines against a variety of flu viruses.

Influenza, or flu, claims thousands of lives nationwide each year. Some flu viruses that infect birds or other animals can change (or mutate) and become able to infect people. This is what happened in the case of the H7N9 bird flu virus. Human H7N9 infections were first reported last year in China. Most affected people had contact with infected poultry.

To test an experimental H7N9 vaccine, NIH-funded researchers enrolled 700 healthy adults in a clinical study. All received 2 injections of the vaccine at differing doses about 3 weeks

apart. Some of the vaccines were combined with an adjuvant, a substance that promotes production of **antibodies**.

The researchers found that the best antibody responses occurred when the vaccine was coupled with the adjuvant. Among those who received 2 injections of the lowest vaccine dose with adjuvant, 59% had a powerful antibody response. Without the adjuvant, even the highest vaccine dose prompted little response.



### Definitions

#### Antibodies

Germ-fighting molecules made by the body's immune system.

The scientists also found evidence that just a single dose of the vaccine plus adjuvant may be enough to protect against the virus. Still, more research is needed to see how long the antibody responses may last.

"Although this influenza virus does not currently spread easily from person to person, all novel influenza viruses have the potential to evolve to cause widespread illness or death," says Dr. Anthony S. Fauci, director of NIH's National Institute of Allergy and Infectious Diseases. "It is prudent to conduct clinical trials such as this one to be prepared in the event of an H7N9 avian influenza pandemic." ■

## Participating in Alzheimer's Research

Alzheimer's disease is a brain disorder that slowly destroys memory and thinking skills. Eventually, affected people can't perform even simple tasks. There's no cure, but researchers are now testing new ways to diagnose, treat, or even prevent Alzheimer's disease.

You can make a difference by volunteering to participate in clinical studies. When you participate in clinical research, you become a partner in scientific discovery.

*Participating in Alzheimer's Research: For Yourself and Future Generations* is a new 20-page booklet from NIH. It can help you decide if partici-

pating in clinical research is right for you, a friend, or a family member.

At least 70,000 volunteers are now needed for more than 150 Alzheimer's and related clinical studies in the U.S. All kinds of people, including healthy older adults, can join in this research. Volunteering may also help future generations lead healthier lives.

Read, download, or order free copies of *Participating in Alzheimer's Research* by visiting [www.nia.nih.gov/alzheimers/publication/participating-alzheimers-research](http://www.nia.nih.gov/alzheimers/publication/participating-alzheimers-research) or calling NIH's Alzheimer's Disease Education and Referral Center at 1-800-438-4380. ■

## Featured Website

### Safe to Sleep

<http://safetosleep.nichd.nih.gov/>

Sudden infant death syndrome (SIDS) is the leading cause of death among infants between 1 month and 1 year of age. Find out how you can reduce your baby's risk of SIDS and other sleep-related causes of infant death.

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