VOLUME 18, ISSUE 4

TUSTEd Health Information from

Trusted Health Information from the National Institutes of Health

IN THIS ISSUE

Understanding and treating ADHD

What you need to know about anxiety disorders

Common antidepressants and how they work

20 YEARS OF THE SISTER STUDY

Find out what this national study can tell us about breast cancer and other health risks

Penn Holderness explains how his mind works in unique ways

UNDERSTANDING ADHD

In this issue

WELCOME TO VOLUME 18, ISSUE 4 OF NIH MEDLINEPLUS MAGAZINE.

We're closing out 2023 with articles about attention-deficit/hyperactivity disorder (ADHD), anxiety and antidepressants, and a groundbreaking breast cancer study.

This issue's cover star Penn Holderness shares his experience being diagnosed with ADHD as an adult. The YouTube content creator and winner of *The Amazing Race* credits much of his success to his condition and calls for greater understanding of ADHD as a lifelong journey. We also take a deeper dive into ADHD's signs and treatments and clear up some common questions about it.

We also recognize the 20th anniversary of the Sister Study, a nationwide epidemiological breast cancer study of women led by the National Institute of Environmental Health



Sciences. Hear from the study's lead researcher, the women who are still participating in the study, and the recruiters who brought them into the project. Find out what we've learned from the study and why people choose to stay in it all these years later.

Plus, we give an overview of anxiety disorders and medications commonly used to treat them. Anxiety can take many forms, and it's important to recognize the signs.

Thanks for reading all the vital health information in NIH MedlinePlus Magazine this year, and we'll see you in 2024!

NIHMedlinePlus

MAGAZINE

WHO WE ARE

The National Institutes of Health (NIH) is the **nation's premier medical research agency**, with 27 different Institutes and Centers. The National Library of Medicine (NLM) at NIH is a leader in biomedical informatics and data science research and the world's largest medical library.

NLM provides **free, trusted health information** to you at <u>MedlinePlus.gov</u> and in this magazine. Visit us at <u>www.magazine.medlineplus.gov</u>.

Thanks for reading!

CONTACT US

Email <u>NLMCommunications@nlm.nih.gov</u>

Phone 301-496-6308

CONNECT WITH US

Follow us on Facebook www.facebook.com/

nationallibraryofmedicine Follow us on X @NLM_NIH



f X

VOLUME 18 ISSUE 4



Penn Holderness, right, and his wife Kim won The Amazing Race in 2022.

FEATURES

04 Taking on the stigma of ADHD

The Amazing Race winner Penn Holderness explains how his mind works in unique ways

07 Understanding ADHD

What you need to know

10 What medications are used to treat ADHD?

Medication won't "cure" ADHD, but it can help

11 Exploring ADHD... with science!

New research helps us understand this condition in children and adults

13 Voices of the Sister Study

Recruiters and participants explain why this national breast cancer study matters

15 6 findings from the Sister Study you should know

The 20-year breast cancer study can teach us about other health risks, too

- **17** Anxiety: What you need to know Stressful or traumatic events and family history could increase your risk
- **19 4 types of common anxiety disorders** *Not all types of anxiety are the same*
- **20 Commonly prescribed antidepressants and how they work** *Finding the right one can take time*
- 22 Contact us NIH is here to help



16 Who are the "Sisters"? A snapshot of the participants in a 20-year breast cancer study



Taking on the stigma of ADHD

The Amazing Race winner Penn Holderness explains how his mind works in unique ways

Penn Holderness wasn't diagnosed with ADHD until adulthood.

Penn Holderness and his wife Kim made history last year by becoming the oldest contestants ever to win the long-running hit TV show, *The Amazing Race*. Holderness, a songwriter, YouTube video producer, and internet personality, attributes this success at least in part to being one of the millions of Americans with attention-deficit/hyperactivity disorder (ADHD). Holderness is a vocal advocate for those with ADHD and uses his online videos to poke fun at the negative stigma associated with the condition. He recently spoke with NIH MedlinePlus Magazine about life with ADHD and his efforts to educate others about what it is...and isn't.

You weren't diagnosed with ADHD until you were in college. Did it affect you as a child before you were diagnosed?

I was diagnosed back in 1995 when I was 20. But I was absolutely aware that something about me was different at an earlier age. I remember there were times as a child when I would get upset and lose control of my emotions. I was curious and interested in school, but it was frustrating for me when I couldn't focus. I needed coping mechanisms, like sitting in the front row, or I would space out. When it came to tests and homework, I was pretty smart and pretty fast, but I made a lot of careless mistakes. And I forgot a lot of stuff. When I was 16 and got my first car, my dad gave three sets of extra keys to my three best friends. He knew I would lose or misplace them. So my parents were coping, too. And they didn't know what ADHD was.

What led to you getting the ADHD diagnosis?

I didn't know what ADHD was until I took an abnormal psychology class in college. It was pretty clear to me when they talked about it that I had some of the traits.

And there were some other clues at about the same time. At a family gathering after my grandmother's funeral, I was deep in thought about her and my childhood. In the midst of it, my aunt said to me, "I'm sorry, Penn? Would you please take that flyswatter out of your mouth?!" I had been chewing on a used flyswatter that I didn't even realize I had in my hand. That was the first time I thought, "I am an adult, and this is highly unusual."

So I set up an appointment to get evaluated, and that is when I got diagnosed.

"Don't ever feel alone. There is a huge community of people who have this and support you. I just want people to know that they are not broken. You are going to be OK."



Penn Holderness, right, and his wife Kim are internet creators and podcasters who cover topics like family and mental health.

What was your reaction to getting the diagnosis?

I wasn't surprised, but I was a little angry. "Attentiondeficit/hyperactivity disorder"—it was so many negative words in a row. It sounded so grave and serious. Even hearing the term "disorder" hurt me. I was a student at the University of Virginia. I graduated second in my class in high school. I was a functional and fairly successful human being—it hurt.

On the other hand, getting diagnosed was also a relief. It helped explain what was going on because I was struggling more with schoolwork in college. There was no way to sit in the front of every class when there were 500 students in a class.

The diagnosis also helped with my relationships. None of my close friends were surprised to hear about it. In fact, I think they were relieved. I would tune people out from time to time and not really be aware of it.

You took medication for a short time; would you talk about that?

I was prescribed and took a medication called dextroamphetamine for about a year and a half after I was diagnosed. It had some positive effects: My friends noticed an improvement in my ability to hold a conversation. And my grades improved. I had my best academic year during my senior year of college.

Personally, it ended up not being for me, so I no longer take dextroamphetamine for my ADHD. But I don't agree with those who say we don't need medication for this *at all*. It is not for everyone, but it is for some people. I realize it definitely makes things better for some people. My view is that you can't judge anyone else for what they are doing.

How does ADHD affect your day-to-day life?

My biggest challenge day to day with ADHD is when too many things come across my mind at the same time. I am really only able to focus on one thing at a time. So it's better for me if I can just finish one thing and move on to the next. But life doesn't work that way.

Here's an example: I wake up in the morning and I turn on the stove to make breakfast for my kids. I realize that I also have a conference call and have to get the kids to school. We get in the car...and I have left the stove on...and everything is burning. I have actually left the stove on a couple of times. But if you know this about yourself, you develop coping mechanisms. Now I set an alarm. If I know I need to make lunch for my son, I do it the night before. That way I can wake up and do one thing at a time.

On the positive side, I'm a songwriter, editor, and producer of creative content. My team will have a meeting and develop an idea for a video to put on the internet. I can hear an idea, then creatively figure out how it will work, sit down and write it, shoot it with my wife, and have the video posted, all within a few hours. It's because that is the one thing I have to do. And when I can focus heavily on one single thing, I can be incredibly efficient. The term a lot of people use for that is hyperfocus. With hyperfocus, you do shut out the rest of the world in a lot of ways to accomplish your task.

Paying attention is a whole different struggle. I often let my thoughts wander and miss what someone is saying. I wouldn't call it *ignoring* people as it's not intentional.

"I am really only able to focus on one thing at a time. So it's better for me if I can just finish one thing and move on to the next. But life doesn't work that way."



Penn Holderness, right, and his wife Kim won The Amazing Race in 2022.

You and your wife won *The Amazing Race* last year. How did your condition affect that?

My ADHD was a huge advantage. That was the most comfortable I have ever been. During the show, you can't have any outside contact with anyone. I had one single job with my wife—to get to the end of this race. There was one challenge at a time, and that is what my ADHD brain is good at. I would have been in a lot of trouble if *The Amazing Race* had challenged us to make a four-course meal!

You have challenged the negative stigma associated with ADHD. Why did you want to speak up about it?

After I was diagnosed, my doctor gave me a book to read about ADHD that I think got it right. The author said that ADHD is not a *deficit* of attention, but rather an *abundance* of attention without the ability to put it in the right place. He said people treat ADHD like they treat a broken leg or arm. They ask, "What's wrong?" and, "How do we fix it?" rather than, "What is different and how do we adapt?" People look at you like you are broken. But we are not broken, we just have different brains.

The second issue is just the name. It labels people negatively, especially kids. Imagine if you are a 10-year-old kid and your doctor tells you that you have a deficit, you have hyperactivity, and you have a disorder. I think ADHD should be renamed; it should not be three negative words in a row. For a lot of people today, as it was when I was growing up, they see someone with ADHD as spacey, who just needs to do a better job paying attention. The fact is we are trying to do that, but we don't have the ability with the way our brains handle executive functioning (things like planning and decision-making).

As a result, there is a lot of shame in having ADHD and not a lot of pride—zero pride. I take on this stigma by saying, "Hey, not only am I fine, I'm also having an awesome time with my brain, and my family has taken the time to understand."

What is your advice to people with family members and loved ones with ADHD or who have the condition themselves?

To those who don't have ADHD—thanks for listening and being willing to hear our perspectives. Those of us with ADHD are trying harder than you think we are. We are so grateful for any grace you give us when we make mistakes.

To those who have ADHD—don't be afraid to admit it. Don't have shame in it. Talk to your family and your health care provider. And don't suppress the great brain that you have.

Also, don't ever feel alone. There is a huge community of people who have this and support you. I just want people to know that they are not broken. You are going to be OK.

Understanding ADHD What you need to know

F veryone has trouble sitting still or staying focused from time to time. But for people with attention-deficit/ hyperactivity disorder (ADHD), these challenges are part of daily life.

What is ADHD?

ADHD is a neurodevelopmental disorder, which means it shapes how the brain develops and functions. It affects the parts of the brain responsible for executive function: the ability to plan, organize, and carry out tasks. This includes being able to maintain focus and attention and being able to manage impulses and emotions.

ADHD is typically diagnosed in childhood, but the symptoms can continue into adulthood. Some people are not diagnosed with it until later in life. ADHD is a medical condition that impacts work, school, relationships, and beyond. It is not caused by laziness or a lack of discipline or intelligence. People who have ADHD can (and do!) lead successful, fulfilling lives—but they may need support to manage their symptoms.

What are the symptoms and signs?

ADHD symptoms typically fall into three categories:

- **Inattention.** People with ADHD often have trouble paying attention to details, following instructions, and completing tasks. They may get distracted easily, struggle with organization and time management, and lose things frequently.
- **Hyperactivity.** Many people with ADHD have trouble sitting still for long periods of time. They might fidget and squirm, be constantly on the go, and talk excessively.
- **Impulsivity.** People with ADHD may interrupt others, act without thinking, and have difficulty waiting their turn.

These symptoms affect people in different ways. They can vary from person to person, might change over time, and may look and feel different in various settings and for people of different ages and gender identities. Cultural beliefs and expectations can also affect how ADHD symptoms present and how they're interpreted by others.

If it's not identified or is left untreated, ADHD can lead to serious challenges in school, at work, and at home. ADHD can also impact personal relationships and increase the risk of substance misuse, injuries, and accidents.

What causes ADHD?

We don't know exactly. But research suggests that several factors probably play a role. These include:

- Genes and heredity. ADHD tends to run in families, which may mean it's inherited. Scientists have also identified several genes that play a role in regulating brain chemicals and may contribute to ADHD development.
- Environment. Studies have found higher rates of ADHD among people who were exposed to certain substances or conditions in the environment (such as lead and air pollution) during prenatal development or in early childhood.
- Brain anatomy and function. Some research suggests that people with ADHD have differences in the structure and function of their brains. These differences could affect attention, impulsivity, and self-control.

Who can be affected by ADHD?

Boys are more likely than girls to be diagnosed with ADHD in childhood. However, this may be due, at least in part, to differences in what ADHD symptoms look like in boys and girls.

For example, young boys are more likely to be more physically hyperactive and impulsive, which may be more disruptive and noticeable to parents and teachers. Symptoms in young girls usually include inattentiveness and low self-esteem, which often look more subtle on the outside.

Gender role expectations can also contribute. In many cultures, girls are expected to be quiet and well-behaved, so their inattentiveness may not be as noticeable. Many girls with ADHD also learn to conform to other people's expectations by hiding or "masking" their struggles.

Coexisting conditions

Over two-thirds of people with ADHD also have at least one other coexisting condition. These can include:

- Anxiety and mood disorders (such as depression)
- Behavioral and conduct disorders (such as difficulty following the rules)
- Learning disabilities
- Sleep problems
- Autism spectrum disorder

Symptoms of these conditions often overlap with ADHD. This can make it hard to accurately diagnose, differentiate between, and treat them.

How does ADHD affect the brain?

People with ADHD may have lower levels of **dopamine**, a chemical in the brain that helps regulate attention and motivation.

Other parts of the brain that play a role include:

- The prefrontal cortex. This is responsible for executive functions such as planning, organizing, and paying attention. People with ADHD often have difficulty with these executive functions.
- **The striatum.** This is located deep in the center of the brain and is involved in reward processing and motivation. People with ADHD may be less sensitive to rewards, which can make it harder for them to stay motivated.
- **Neural networks.** People with ADHD may have differences in how certain areas of their brains communicate. This can make it difficult for them to focus and ignore distractions.



ADHD can cause challenges with attention, focus, hyperactivity, and impulsivity.

By the numbers²

9.4% of children ages 2 to 17 (1 in 11) have been diagnosed with ADHD.

4.4% of adults **ages 18 to 44** (1 in 23) have been diagnosed with ADHD.

The average age of ADHD diagnosis is **7 years old**.

Boys are **2 to 3 times more likely** to be diagnosed than girls.

A child with ADHD has a **1 in 4** chance of having a parent who also has ADHD.

According to a national 2016 survey, **6 in 10** children with ADHD had at least one other mental, emotional, or behavioral disorder:

- About half of the children with ADHD also had a behavior or conduct problem.
- About 3 in 10 children with ADHD also had anxiety.
- Other conditions included depression, autism spectrum disorder, and Tourette syndrome.

How is it diagnosed?

ADHD is diagnosed based on a person's symptoms, history, and behavior. If you or your child are experiencing symptoms of ADHD, the first step is to speak with a health care provider.

The provider will want to know about the symptoms, including when they started, how severe they are, and how they impact aspects of life such as work, school, relationships, and daily functioning.

They'll also look for other possible causes. For example, certain medical conditions and other mental health conditions, as well as nonmedical situations and experiences (such as a sudden life change, trauma, or an ongoing stressor), can trigger symptoms that look a lot like ADHD.

How is it treated?

ADHD treatment typically involves a combination of medication, therapy, and lifestyle modification or skills training.

- Medication can help improve focus and attention in people with ADHD. Stimulants are prescribed most often, but there are also nonstimulant options available. Medication is an effective tool for many people with ADHD, but it can come with side effects, and it may take time to find the right one.
- **Therapy** can help people learn strategies and techniques to manage ADHD symptoms and improve their overall functioning. It can help with organization, time management, and problem-solving.
- Lifestyle modifications, including getting regular exercise, eating nutritious and balanced meals, and getting plenty of sleep, can help manage ADHD. Developing routines and schedules, setting goals, and seeking support from family, friends, and support groups are also important.

With appropriate diagnosis, treatment, and support, people with ADHD can live successful, fulfilling lives. If you think you or your child may have ADHD, it's important to talk to a qualified health care professional about your options.

WHAT'S IN A NAME?

ADHD wasn't called "ADHD" until the late 1980s.

The language used to describe ADHD and its symptoms has changed over time.

One of the earliest accounts of hyperactivity was from 1798, when a Scottish physician observed a condition of "mental restlessness" and "the fidgets" in children that closely resembles what we now call ADHD. The condition was later referred to as "minimal brain dysfunction" in the 1950s, "hyperkinetic reaction of childhood" in the 1970s, and finally "attention-deficit/ hyperactivity disorder" in the 1980s.

SOURCE: THE CENTERS FOR DISEASE CONTROL AND PREVENTION



What medications are used to treat ADHD?

Medication won't "cure" ADHD. But it can help improve focus, attention, and impulse control.

f you or your child has attention-deficit/ hyperactivity disorder (ADHD), you might be curious about medications for treating its symptoms. ADHD medications work best when combined with other treatment strategies such as therapy and behavior management.

To find a treatment that works well, you'll need to work closely with a health care provider who specializes in ADHD treatment.

Here's some information about different medications so you can make an informed decision.

Stimulant ADHD medications

Stimulant medications such as <u>methylphenidate</u> and <u>amphetamine</u> are commonly prescribed to manage ADHD. They work by increasing levels of certain chemical messengers in the brain involved in focus and concentration.

Stimulant medications are available in different forms. Some are short-acting (lasting a few hours), and others are long-acting (lasting throughout the day).

Like any medication, stimulants can have side effects. People taking stimulants may have decreased appetite, difficulty sleeping, and increased heart rate or blood pressure.

Also, stimulants can interfere with certain medications and medical conditions. Because of this, they may not be safe or recommended for some people.

Nonstimulant ADHD medications

Nonstimulant ADHD medications are another option. They may work for people who can't take stimulants or prefer not to take them, or if stimulant medications don't work for them. These medications include <u>atomoxetine</u>, <u>clonidine</u>, and <u>guanfacine</u>.

Some people may find these medications easier to tolerate. However, they are not always as effective.

Antidepressants

Although <u>antidepressants</u> are not specifically approved to treat ADHD, they can sometimes help manage symptoms. The doctor may prescribe antidepressants alone or in combination with one or more ADHD medications. They are especially helpful when a patient also has conditions like anxiety, depression, or mood disorders.



ADHD medications approved by the U.S. Food and Drug Administration are considered safe for children **ages 6 and older**.

SOURCE: U.S. FOOD AND DRUG ADMINISTRATION

Finding the right medication

There's no one-size-fits-all ADHD treatment. Everyone's experience with ADHD is different, and finding the most effective treatment takes time. Here are a few tips to help you on your journey:

- Ask questions. Be sure to talk to your health care provider about the different medications that are available. Ask about potential benefits and side effects and how they may interact with other medications or medical conditions.
- Follow your doctor's instructions carefully. Always take ADHD medications exactly as prescribed. This includes the dose and timing.
- Communicate clearly and openly with your health care provider. Follow up often to discuss how the medication is affecting your or your child's symptoms. If you notice any dramatic changes or negative side effects, let your doctor know right away.
- **Be patient.** Finding the right medication can take time. A health care provider can help you figure out the medication, or combination of medications, and dosage that works best for you.



Exploring ADHD... with science!

New research funded by NIH helps us understand this condition in children and adults

ttention-deficit/hyperactivity disorder (ADHD) affects millions of people worldwide. We know more about ADHD than we used to, but there's still a lot left to learn. Here are some exciting new discoveries from NIH-funded research and opportunities to get involved.

ADHD brains look a little different

We know that certain areas of the brain can look and function differently in people who have ADHD, and scientists have found that certain genes play a role in these differences. But that doesn't tell them exactly *how* these genes contribute to ADHD symptoms.

A team at the National Human Genome Research Institute used postmortem brain tissue (which are taken during an autopsy) and compared gene activity in people with and without ADHD.

The scientists discovered differences in two connected brain regions—the caudate nucleus and the prefrontal cortex—that are involved in attention and impulse control. The differences also affected certain chemical messengers in the brain that play a role in attention and learning. These findings could help scientists better understand the causes of ADHD. <u>Read more</u> <u>about this study</u>.

Helping teens with ADHD become safer drivers

Teen drivers with ADHD are <u>more likely to be involved</u> <u>in a car crash</u> than their peers. One reason for this is that they tend to get distracted and take their eyes off the road for longer periods of time. But a study funded by NIH showed that a computer-based driving simulation program could help reduce crash risk for these teens by almost 40%.

Researchers at the Cincinnati Children's Hospital Medical Center wanted to teach safer driving skills to teens with ADHD. They tested a program that teaches teen drivers to limit long glances away from the road. The program, called "FOCALplus," combines computer-based training with a driving simulator. The simulator lets them practice what they've learned in a virtual environment. It gives them immediate feedback on their glances by sounding an alarm when they look away for two seconds or longer.



Eye-tracking glasses measure the number and duration of glances away from the roadway.



The study was small—it enrolled only 152 teenagers with ADHD. Half of them participated in five sessions of the FOCALplus program. The other half also got computer-based training and a virtual driving task, but they did not get alerts when they looked away for too long. The researchers put cameras on all the teens' vehicles and monitored them over the next year to find out how the program impacted their real-life driving skills.

The results were striking. Teens who used the FOCALplus program had fewer long glances while driving in real life than those who did not. They also had fewer crashes and near crashes than the control group. These findings suggest that the program could be a valuable tool for helping teens with ADHD become safer drivers. Learn more about this research.

Studying how genes, brain structure, and environments affect ADHD

This observational study will look at how genes, brain structure, and environmental factors affect ADHD in children and adults. Researchers recruited participants ages 3 and older who have ADHD and will follow them over the long term. They also recruited families that have several members with ADHD. Learn more.

Want to get involved in ADHD research?

Here are some NIH-supported studies about ADHD that are currently recruiting participants.

Exploring new treatment approaches for parents with ADHD



Because ADHD runs in families, children of parents with ADHD are more likely to develop ADHD. This study will test early intervention programs for parents with ADHD who have

young children. The programs will include behavioral parent training and medication. The study will also look at using telehealth to offer families treatment and support. The results will help doctors and other health care providers decide which treatment is best for each child and family. <u>Find out more</u>.

Managing attention with virtual reality

This small-group research project will test a new treatment that uses virtual reality (VR) technology to help children learn to avoid distractions. Children with ADHD will wear a VR headset that simulates a distracting classroom environment. If the treatment is successful, it could help people with ADHD—and people who are generally easily distracted in other areas of their lives. <u>Discover more</u>.

Testing trigeminal nerve stimulation for ADHD

Trigeminal nerve stimulation (TNS) is a noninvasive, non-drug treatment. It works by applying mild electrical stimulation to the forehead during sleep. It is FDA-approved for treating several conditions in adults and for treating ADHD in children who are not taking prescription ADHD medications. It has been shown to increase activity in brain regions associated with attention and impulse control. This study will investigate TNS treatment in children ages 7 to 12 who have ADHD. <u>Read more</u>.

Other ways to get involved

You can also visit <u>ClinicalTrials.gov</u> to find out about ADHD research happening around the world and to learn how to get involved.

BREAST CANCER



Dr. Dale Sandler, principal investigator for the Sister Study.

Voices of the Sister Study

Recruiters and participants explain why this national breast cancer study matters

or 20 years, the <u>Sister Study</u> has partnered with more than 50,000 women across the United States to learn about breast cancer risks. The participants are women whose sisters have had breast cancer.

Dale Sandler, Ph.D., principal investigator for the Sister Study, said people with a family history of breast cancer are more likely to develop it themselves. To study this, researchers needed a large group of people with a shared family history but who did not already have breast cancer. Sisters tend to share genes, environments, and experiences, making them good study volunteers. Researchers also wanted the study group to include women from diverse backgrounds, locations, and races or ethnicities.

Once the women enrolled, researchers needed to follow them for a long time. Two decades later, recruiters and participants shared why the study was important to them and their communities.

The recruiters

Catherine Andrews was a study recruiter for older adults. Both she and her mother had breast cancer. Andrews discovered that finding women from so many parts of the country was a challenge. Churches, radio stations, sororities, hair shows, nonprofit organizations, and labor unions were important partners for recruiters like Andrews.

"We had to gain the trust of the women—you just don't walk [up] to women in St. Louis and say, 'Here we are, accept us,"" she said. "We had to have volunteers from the local communities to help us gain the trust of the women."

Lourdes Suárez was a recruitment manager and recruiter for Latinas. She said when researchers explained the study's methods, they received support from community leaders by engaging with them on a personal level.

"[For] some of these communities, same with Black communities and Native communities, there's this terrible history of taking advantage and not properly treating folks as they should. So those communities, understandably so, are protective," she said. "Convincing them, really, of giving their endorsement their okay to go into their communities—makes a difference."

Mary Quezada was also a recruiter for Latinas. She said to make study recruitment accessible and inclusive, they needed to have Spanish-language resources and recruiters.

"The information that comes out of the Sister Study is so useful, so actionable, so interesting, so engaging, so warm. It's really effective. It keeps me involved."

-Rebecca, Sister Study participant

"I still think that the effort made by the researchers on this study is different they were so intentional about making sure that the participants' experience was comfortable."

-Carrissa Dixon, Sister Study recruiter for Black women

"We have a team of bilingual interviewers...and that was very important for these ladies because they were hesitant to be part of it. Because they felt that they might not be understood," she said. "It's not only just providing information, but many times they're telling a story of their lives and their families and how they suffered or overcame the disease, or that it was a struggle."

Carrissa Dixon was a recruiter for Black women. She also had an older relative with breast cancer. She said being part of the study taught her about clinical research and public health.

"I was a recruiter, but understanding the science of it was also fascinating for me," she said. "I still think that the effort made by the researchers on this study is different they were so intentional about making sure that the participants' experience was comfortable."

The participants

The Sister Study asks participants questions every year about their health, living environments, and family details. And participants are good about answering! Approximately 90% of women complete their questionnaires each time, which Dr. Sandler said is high for long-term studies.



SOURCE: NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES



Sister Study recruiters: (front row, left to right) Catherine Andrews, Carrissa Dixon, and Mary Quezada; (back row, left to right) Lourdes Suárez and Sara Williams.

"Every year that I receive my questionnaires, I answer them happily and send them," said Cynthia, a Sister Study participant. "I feel that just by answering the questions, I'm helping research so much that I feel happy, and I would like everybody to do the same."*

Cynthia joined the study because two of her sisters had breast cancer. Her mother, father, and brother also had uterine, prostate, and kidney cancers, respectively. Cynthia herself was one of more than 4,500 people who developed breast cancer after joining the study.

Diana was also one. She joined the study because her sister had breast cancer. Now she thinks about how this research can affect younger people.

"I have daughters, and I know that they have a greater risk," she said. "This has made them more conscientious about the importance of getting certain types of [screenings] done early on. Possibly even earlier than is usually suggested. And I believe a lot in prevention."*

Rebecca joined the study because her mother and sister had breast cancer.

"The information that comes out of the Sister Study is so useful, so actionable, so interesting, so engaging, so warm. It's really effective. It keeps me involved," she said.

Bonnie not only joined the study; she convinced her sister to join, too. They took part because another sister had breast cancer, but Bonnie said her whole community is affected.

"I have neighbors that have breast cancer, childhood friends that have breast cancer. My sister finally passed away from breast cancer. And I just truly hope that in some way, enough information can be collected to help researchers find a cure for this."

Find the full interviews and more about the Sister Study at the <u>National Institute of Environmental Health Sciences'</u> <u>online information hub</u>.

*Translated from Spanish



findings from the Sister Study you should know

The 20-year breast cancer study can teach us about other health risks, too

Since 2003, the still ongoing <u>Sister Study</u> has followed more than 50,000 women from all 50 states and Puerto Rico to find causes of breast cancer. The study led to findings about relationships between disease, lifestyle, and environmental factors.

Here are six major findings from the Sister Study that may surprise you:

1. Chemical hair straighteners and risk of uterine cancer

Women in the study who used chemical hair straighteners had a higher risk of uterine cancer. They were more than twice as likely to develop uterine cancer than women who did not use chemical hair straighteners. The risk was highest in women who used these products more than four times in one year.

2. Talc use, douching, and risk of ovarian cancer

Sister Study data has been used to measure cancer risks from using feminine hygiene products. Although seen in other studies, researchers did not find an increased risk of ovarian cancer from talc use in the 12 months prior to enrollment. Talc is a mineral sometimes used in genital powders. It can contain asbestos, which can cause cancer if inhaled. But researchers did see increased risk of ovarian cancer associated with douching (washing or cleaning the vagina with water or other mixtures of fluids).

3. Discrimination and risk of type 2 diabetes for White, Black, and Hispanic/Latina women

Women who reported experiencing major racial or ethnic discrimination had a higher risk of type 2 diabetes. The study defined "major discrimination" as systemic or structural. This could mean experiences such as being denied jobs or promotions or being threatened by a police officer. Black women were more likely than White or Hispanic/Latina participants to report experiencing major discrimination because of their race or ethnicity. 4. Vitamin D levels and risk of breast cancer among Black and Hispanic/Latina women

Women with enough vitamin D in their blood were less likely to get breast cancer than women with <u>low vitamin D</u> <u>levels</u>. This was especially true for Hispanic/Latina women. Both Hispanic/Latina and Black women tended to have lower vitamin D levels than White women.

5. Artificial light during sleep and risk of obesity People exposed to <u>artificial light</u> while sleeping were more likely to be affected by obesity both before and after they joined the study. Artificial light can come from inside the bedroom such as from nightlights or televisions, or it can come from outside like streetlights. The strongest link between artificial light and obesity was sleeping with a light or television on in the room.

6. Neighborhood characteristics can affect risk of high blood pressure

Living in neighborhoods without necessary things such as grocery stores or doctors may increase risk for <u>hypertension</u> (high blood pressure). The Sister Study categorized addresses of its participants using census data on home values, poverty rates, and other factors. Women who lived in under-resourced neighborhoods had higher rates of hypertension. Black women living in these neighborhoods had the highest rates of hypertension.

Women enrolled in the study from 2003 to 2009. Most are still active in the study through regular follow-up activities. Find the full library of research from the Sister Study <u>here</u>.

FAST FACT: As of September 2023, **more than 300** research papers have been published using Sister Study data.



SOURCE: NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES





A snapshot of the participants in a 20-year breast cancer study

The Sister Study is a long-term study of more than 50,000 women whose sisters have had breast cancer. These women are twice as likely to develop the disease compared to women without affected sisters, according to the National Institute of Environmental Health Sciences. The study examines how breast cancer risk is related to people's environment and biology.

The study enrolled participants from 2003 to 2009, and researchers are still gathering information from them today. Here is a snapshot of who these women were when they enrolled in the study.¹

Menopausal status³



Ever used hormone replacement therapy



Participants were enrolled from all 50 states and Puerto Rico.

SOURCE: NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Age at enrollment

35–44 ·····	13%
45–54	34%
55–64	35%
65 or older	17%

Self-reported race/ethnicity

White (non-Hispanic)	84%
Black/African American (non-Hispanic)	9%
Hispanic/Latina	5%
Other	3%

Age at first menstrual period (years)² 11 or vounger 20%

	20 /0
12–13	56%
14 or older	23%

Ever used hormonal birth control





History of breastfeeding 57% Yes 43% Never (includes women with no children)



Education







Body Mass Index (BMI)⁴

Inderweight (less than 18.5)	. 1%
lealthy weight (18.5–24.9)	37%
Dverweight (25–29.9)	32%
Dbese (30 or more)	30%

Alcohol intake⁴



Percentages may not add up to 100 due to rounding and missing data for some participants.

- Having your first period (called menarche) at a younger age 2 is associated with greater risk of breast cancer.
- Natural menopause begins when someone doesn't have a menstrual cycle for 12 consecutive months. Menopause can also be triggered by the surgical removal of the ovaries.
- ⁴ 12 months prior to enrollment.

ANXIETY: What you need to know

Stressful or traumatic events and family history could increase your risk.

Anxiety is a natural part of life, and most of us experience it at some point. You might feel nervous, jittery, or on edge before taking a test, crossing a busy street, or making an important life decision. If you experience anxiety without a reason or more often or severely than expected, it may signal an anxiety disorder.

What is anxiety?

Anxiety triggers the body's fight or flight response: your heart beats faster, more blood flows to the muscles, your breathing becomes heavier, and your muscles tense up. These changes prepare us to respond quickly to threats. But for people with an anxiety disorder, these feelings can become overwhelming and interfere with everyday life.

Anxiety disorders are the most common form of mental illness in the United States. They can affect people of all ages, backgrounds, and walks of life. <u>Common types</u> include generalized anxiety disorder, social anxiety disorder, panic disorder, and specific phobias.

Who is at risk?

Anyone can develop an anxiety disorder, but some risk factors make developing one more likely. These include a family history of anxiety disorders or mental illness, experiencing traumatic or stressful events, and underlying medical conditions.

What are the symptoms?

Everyone feels anxiety differently. Some common symptoms include:

- Physical symptoms such as increased heart rate, rapid breathing, dizziness, shortness of breath, and headaches
- Cognitive and emotional symptoms such as irritability, difficulty concentrating, and feeling restless, worried, or unable to sit still
- Changes in behavior such as avoiding places, situations, and everyday activities that trigger anxiety or taking extreme steps to reduce or eliminate what is causing the anxiety

How are anxiety disorders diagnosed?

Your health care provider will ask you questions about your symptoms and medical history. They may also do a physical examination and run tests to rule out any medical conditions that could be causing your anxiety. If necessary, they can refer you to a mental health specialist such as a psychologist, psychiatrist, or therapist.

* This article was originally published in November 2019. It was updated in August 2023 to reflect new information and developments.



How are anxiety disorders treated?

The good news is that anxiety is treatable. Different strategies to help manage your anxiety may involve psychotherapy, medication, or both.

Psychotherapy methods may include:

- **Cognitive behavioral therapy**, or CBT, which teaches people different ways of thinking, behaving, and reacting to situations to help them feel less anxious or afraid
- **Exposure therapy**, a type of CBT that helps people confront fears so they can participate in activities they have avoided
- Acceptance and commitment therapy, which uses strategies such as mindfulness and goal setting to help people live fulfilling lives despite their anxiety

<u>Medication</u> doesn't cure anxiety, but it can help some people manage their symptoms. Some may include:

- Anti-anxiety medications, which may reduce the symptoms of anxiety, panic attacks, or extreme fear and worry
- Antidepressants, which can improve the way the brain uses certain chemicals that control mood or stress
- Beta blockers, which can relieve physical symptoms of anxiety such as rapid heartbeat, shaking, trembling, and blushing

Other strategies can help you manage anxiety and make treatment more effective. These include exercise, relaxation techniques such as deep breathing or meditation, and lifestyle changes such as limiting caffeine and alcohol and getting enough sleep.

A strong social support system is also important, whether it's through talking to friends and family or joining a support group.

Getting help

Remember, feeling anxious sometimes is normal. But if your symptoms last a long time, get worse, or interfere with your day-to-day life, it may be a sign of an anxiety disorder. If you or someone you know is experiencing symptoms of anxiety disorders, reach out to a health care provider. <u>Help is available</u>, and you don't have to face your anxiety alone.

More NIH resources

Learn more about anxiety and get helpful tips for managing it. Check out these videos from the National Institute of Mental Health.

- NIMH Expert Dr. Krystal Lewis Discusses Managing Stress & Anxiety
- <u>GREAT: Helpful Practices to Manage Stress and Anxiety</u>
- Mental Health Minute: Anxiety Disorders in Adults



Physical symptoms can include increased heart rate, dizziness, and shortness of breath.

4 types of common anxiety disorders Anxiety affects millions of people in the United States alone. But not all types of anxiety or anxiety disorders are the same.

hile anxiety disorders vary based on symptoms and triggers, they can all interfere with daily activities. Understanding the different types can help people recognize their symptoms. Anxiety disorders can feel scary and disruptive, but <u>help is available</u>.

Here's a closer look at four common types of anxiety disorders.



Generalized anxiety disorder

People with <u>generalized anxiety</u> <u>disorder</u> (GAD) feel frequent extreme anxiety or worry for months, if not years. They may

feel restless, on edge, or easily tired. They may also experience concentration problems, irritability, muscle tension, or sleep issues. Treatment options for GAD include cognitive behavioral therapy, relaxation techniques, and sometimes medication.



Panic disorder

People with <u>panic disorder</u> experience frequent and unexpected panic attacks. Panic attacks are sudden, intense feelings of fear or terror when no immediate danger is present. Physical

symptoms can include a fast heartbeat, chest or stomach pain, and trouble breathing. You may also feel weakness or dizziness, sweating, chills, or numb hands. During a panic attack, you may feel detached from reality, like you don't have control over your body or thoughts. You may even worry that you're having a heart attack. Some people feel a sense of impending doom or that something terrible is going to happen. Most people with panic disorder can get better with treatment, which may include cognitive behavioral therapy and sometimes medication.



Phobia-related disorders

A <u>phobia</u> is an intense fear of or aversion to specific objects or situations. This fear is not equal to the actual danger that can be caused by the situation or object. Examples include

agoraphobia (fear of public places) and claustrophobia (fear of closed-in spaces). Other common phobias include flying, heights, certain animals, and needles. People with a phobia may go out of their way to avoid the feared object or situation and experience immediate anxiety when faced with it. Treatment approaches include a form of cognitive behavioral therapy called exposure therapy (which involves gradual exposure to the feared object or situation) and sometimes medication.



Social anxiety disorder

People who have <u>social anxiety disorder</u> experience an intense fear of one or more social situations. They may feel very self-conscious or worried about being

embarrassed or judged by others. This fear can get in the way of everyday activities such as going to work, school, or social gatherings. Treatment options include therapy and sometimes medication. Support groups can also help.

All anxiety disorders involve excessive fear or worry that disrupts daily life.

* This article was originally published in November 2019. It was updated in August 2023 to reflect new information and developments.

Commonly prescribed antidepressants and how they work

Finding the right one can take time.

ntidepressants are among the most searched-for medications online. But there is a lot of information out there to sift through. We've pulled together some useful information about common types of these medications from MedlinePlus and the National Institute of Mental Health.

What are they?

Antidepressants are medications that help relieve symptoms of depression and other mental health conditions such as anxiety. They are sometimes also used to treat other conditions, including chronic pain and sleeping disorders.

These medications may need to be taken for a few weeks (often four to eight) to fully work. You may need to try a few different ones before you and your health care provider find the best option for you.





Antidepressants can help treat depression, anxiety, and other conditions.

How do they work?

The brain is a complex organ, and researchers are still learning about how and why antidepressants affect it. In general, though, antidepressants act on chemical messengers called neurotransmitters. Neurotransmitters play a role in regulating mood, cognition, and other things (such as behavior, sleep, and memory). They work by changing levels and activity of certain neurotransmitters, including:

- Serotonin, which helps regulate mood, appetite, sleep, and pain perception
- Norepinephrine, which is involved in the body's stress response and plays a role in mood regulation and alertness
- **Dopamine**, which is associated with motivation, reward, and pleasure

What are the different types?

Different types of antidepressants affect the brain's chemistry in different ways.

Selective serotonin reuptake inhibitors (SSRIs) are the most prescribed type of antidepressant. They work by increasing levels of serotonin in the brain. They generally have fewer side effects than other types of antidepressants. Common SSRIs include fluoxetine, citalopram, sertraline, paroxetine, and escitalopram.

* This article was originally published in March 2020. It was updated in August 2023 to reflect new information and developments.



Serotonin and norepinephrine reuptake inhibitors (SNRIs) are similar to SSRIs. They help regulate mood by increasing levels of serotonin and norepinephrine. Common SNRIs include venlafaxine and duloxetine.

Atypical antidepressants work differently than SSRIs and SNRIs. These medications may be prescribed when other types of medications don't work or cause unwanted side effects. People with certain conditions or genetic factors may respond better to atypical antidepressants than other types of antidepressants. Some people take them in combination with an SSRI or SNRI. These medications include:

- **Bupropion**, which also treats seasonal affective disorder and can help people stop smoking.
- **Mirtazapine**, which is sometimes prescribed for people who have trouble sleeping or have lost their appetite due to depression.
- Trazodone, which is also used to treat insomnia and anxiety.

Older antidepressant medications include tricyclics, tetracyclics, and monoamine oxidase inhibitors (MAOIs). These drugs are prescribed less often than other medications because they tend to cause more side effects. However, they work better for some people.

What are the side effects?

Antidepressant medications affect people in different ways. Possible side effects include:

- Nausea and vomiting
- Weight gain
- Diarrhea
- Sleepiness
- Sexual problems

Not everyone will experience side effects. Some people may experience only mild ones that go away as their body adjusts to the medication.



In some cases, antidepressants can lead to more serious side effects. These may include new or increased suicidal thoughts, especially in children, adolescents, and young adults. If this happens, it's important to get medical help right away.

Where can I learn more about these medications?

If you or someone you know thinks they have depression, talk to a health care provider as soon as possible. Antidepressants, therapy, or a combination of the two may help. Depression is a complex condition, and finding the right treatment can take time.

If you or someone you know is experiencing a mental health crisis, the <u>988 Suicide & Crisis Lifeline</u> is a **national**, **24**/7 **hotline** that can connect you with a trained crisis counselor by phone or online chat. Call or text 988 to connect to a trained crisis counselor or use the live online chat option. TTY users can contact the Lifeline via their preferred relay service or by dialing 711, then 988.

NIH is here to help

The National Institutes of Health (NIH)—the nation's medical research agency—includes 27 Institutes and Centers and is a part of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical, and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

National Institutes of Health (NIH) www.nih.gov Ask NIH: www.nih.gov/about-nih/ask-nih

Institutes

National Library of Medicine (NLM) www.nlm.nih.gov 888-FIND-NLM 888-346-3656

National Cancer Institute (NCI) www.cancer.gov 800-4-CANCER 800-422-6237

National Eye Institute (NEI) www.nei.nih.gov 301-496-5248

National Heart, Lung, and Blood Institute (NHLBI) www.nhlbi.nih.gov 301-592-8573

National Human Genome Research Institute (NHGRI) www.genome.gov 301-402-0911

National Institute on Aging (NIA) www.nia.nih.gov Aging information: 800-222-2225 Alzheimer's information: 800-438-4380

National Institute on Alcohol Abuse and Alcoholism (NIAAA) www.niaaa.nih.gov 301-443-3860

National Institute of Allergy and Infectious Diseases (NIAID) www.niaid.nih.gov 301-496-5717 National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) www.niams.nih.gov 877-226-4267

National Institute of Biomedical Imaging and Bioengineering (NIBIB) www.nibib.nih.gov 301-451-6772

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) www.nichd.nih.gov 800-370-2943

National Institute on Deafness and Other Communication Disorders (NIDCD) www.nidcd.nih.gov Voice: 800-241-1044 TTY: 800-241-1055

National Institute of Dental and Craniofacial Research (NIDCR) www.nidcr.nih.gov 301-480-4098

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) www.niddk.nih.gov NIDDK Health Information Center 800-860-8747 National Institute on Drug Abuse (NIDA) www.nida.nih.gov 301-443-1124

National Institute of Environmental Health Sciences (NIEHS) www.niehs.nih.gov 919-541-3345

National Institute of General Medical Sciences (NIGMS) www.nigms.nih.gov 301-496-7301

<u>National Institute of Mental Health</u> (NIMH)

www.nimh.nih.gov 866-615-6464

National Institute on Minority Health and Health Disparities (NIMHD) www.nimhd.nih.gov 301-402-1366

National Institute of Neurological Disorders and Stroke (NINDS) www.ninds.nih.gov 800-352-9424

National Institute of Nursing Research (NINR) www.ninr.nih.gov 301-496-0207

Centers & Offices

Division of Rare Diseases Research Innovation

www.ncats.nih.gov/about/center/org/drdri Genetic and Rare Disease Information Center: 888-205-2311

Fogarty International Center (FIC)

www.fic.nih.gov 301-496-2075

National Center for Complementary and Integrative Health (NCCIH) www.nccih.nih.gov 888-644-6226 National Center for Advancing Translational Sciences (NCATS)

www.ncats.nih.gov 301-435-0888

NIH Clinical Center clinicalcenter.nih.gov 301-496-2563s

Office of AIDS Research (OAR) www.oar.nih.gov

301-496-0357

Office of Behavioral and Social Sciences Research (OBSSR) www.obssr.od.nih.gov 301-402-1146

Office of Communications & Public Liaison (OCPL)

www.nih.gov/institutes-nih/nih-office-director/ office-communications-public-liaison 301-496-5787

Office of Research on Women's Health

(ORWH) orwh.od.nih.gov 301-402-1770



One of the top 10 used government websites!





MedlinePlus en español

Since 1998, MedlinePlus has brought the public easy-to-read information on over 1,000 health topics. From drug information to dietary supplements, medical test descriptions and more, MedlinePlus has expertreviewed, reliable answers to your health questions. No wonder nearly

500 million people visit MedlinePlus each year!



MedlinePlus



www.medlineplus.gov