

Is ADHD Genetic?

Research shows that most of the risk for ADHD is genetic. But environmental factors can play a role and, in some cases, are the cause. Here's what to know.

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Forget what you've heard about too much sugar, too much TV or poor parenting skills. Seventy-five to 90% of ADHD risk can be traced to our genes, researchers report.

"The current estimate is that about 7,000 different genes are involved in susceptibility to [ADHD](#)," says Stephen Faraone, PhD, professor and vice-chair for research in the department of psychiatry at SUNY Upstate Medical University in Syracuse, New York. "Each one increases your risk a tiny bit."

Faraone studies the genetics of **ADHD**. He was part of a large, international research project that in 2019 identified the first areas of the human genome linked to ADHD.¹ The study compared the genes of 20,000 people with ADHD to those of 35,000 people without this neurodevelopmental brain disorder.

Most of the time, there's not one gene causing ADHD (though that may happen in rare cases, Faraone says.) "And it's not that a person with ADHD would have all 7,000 genes," he explains. "Different people have these genes in different combinations and numbers. A lot of people have an average number, a few people have a lot, a few have very little.

If you get a certain number of them plus a certain number of environmental risks, this pushes you over the threshold into ADHD."

Scientists are still trying to pin down how genes boost ADHD risk and how the environment of a susceptible child, teen, or adult could bring out [ADHD symptoms](#) like hyperactivity, impulsivity and/or inattention and lack of focus. "It's important for **parents of children with ADHD** to understand that they shouldn't blame themselves. The causes of ADHD are extremely complex. We think most environmental risks, like genetic risks, are small and incremental."

Genetics

Genes and ADHD

Risk for ADHD runs in families. In a recent Norwegian study² of 2.4 million people, 17 to 24% of children who had one parent with ADHD also had ADHD. And when both **parents had ADHD**, so did 33% of children.

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Inherited, genetic risk shows up in other ways, too. Brothers and sisters of a child with ADHD have a 26 to 42% risk for ADHD.³ And in families where a child has ADHD, it turns out that many parents do, too, though they may not realize it until their son or daughter is diagnosed.²

"Parents should understand their risk for having ADHD is about 25%. That's big enough to be concerned, because ADHD yourself can make parenting more challenging," Faraone says. "You could talk with your doctor, ask your partner or a trusted friend what they see or **take a self-assessment**."

ADHD and the Brain

How ADHD Impacts the Brain

How genes raise risk isn't well-understood yet. But researchers do know that many of the genes they've found play roles in the brain. Some help regulate brain chemicals called neurotransmitters, such as norepinephrine and dopamine, which is involved with thought, attention, learning and motivation.^{4,5}

Low levels of the neurotransmitter dopamine are a hallmark of ADHD and have been linked with ADHD symptoms including **inattention** and unstable moods, according to

CHADD.⁶ In a November 2022 study, researchers from the National Human Genome Research Institute found differences in how genes controlled neurotransmitters in the caudate and frontal cortex regions of the brain – areas involved in controlling attention.⁴

Genes are likely involved in other key differences found in the brain of people with ADHD. These include smaller-sized regions involved with focus and attention, including the prefrontal cortex and basal ganglia, and in the cerebellum, which regulates movement.⁷

Some parts of the brain also develop more slowly in kids, teens and young adults with ADHD. “We don’t know with any certainty how the genes are working but we have theories,” Faraone says. “I think finding out will be a long process.” Someday, he says, research could lead to genetic tests for ADHD risk and to new treatments, but not soon.

Other Causes

The Environment and Other Causes of ADHD

Experts think that in people with higher genetic risk for ADHD, the environment before and after birth and in childhood could trigger ADHD symptoms. And in some cases, some environmental factors are powerful enough to cause ADHD by affecting the brain directly. These factors may be involved:

Premature birth and low birthweight

In an analysis of twelve studies with over 6,000 participants, extremely premature or extremely low birthweight tripled risk for ADHD. Other studies have also found some risk, increasing with lower birthweights and earlier premature birth dates.⁸

Lead exposure

Higher blood levels were linked with a four times higher risk for ADHD, compared to the lowest blood levels, in a 2020 analysis of 14 studies involving more than 17,000

children. Other research has found that lead exposure could double the risks.⁸

Traumatic brain injury in childhood

A severe brain injury early in life increased the risk for later ADHD in a recent University of California Los Angeles analysis of 24 studies involving 12,374 people who'd had childhood head injuries. Concussions and mild injuries didn't raise risk.⁹

Fetal alcohol syndrome (FAS)

Children with this syndrome, caused by exposure to high levels of alcohol before birth, are five times more likely to develop ADHD compared to kids with FAS.¹⁰

New Knowledge

What Doesn't Raise the Risk of ADHD?

Once thought to be associated with ADHD risk, it turns out these don't boost odds for this brain condition:

Lots of sugar, food additives and/or a poor diet

There's no proof that a [sugary diet](#), additives can cause ADHD, according to CHADD. The group notes that in a small number of kids who already have ADHD, sensitivities to certain foods or to colorings, preservatives, and other additives could have an effect but more research is needed.¹¹

Video games and TV watching

Kids and teens with ADHD may be captivated by colorful, fast-paced [video games](#), but there's no evidence that playing them—or watching TV—boosts risk according to the Child Mind Institute.¹²

Poor parenting or a chaotic home

“The idea that parents cause ADHD arose from the naïve observation that children with ADHD frequently misbehaved, along with the belief that misbehavior was a sign of poor parenting,” notes Faraone. “There is no evidence that lax parenting leads to the inattention, hyperactivity and impulsivity that define ADHD.”

Vaccines

Three large studies involving more than 200,000 kids show that childhood vaccinations do not cause ADHD.¹³

Prenatal exposure to tobacco smoke

Long considered a risk for ADHD, it turns out exposure to tobacco smoke in the womb doesn't increase the odds, according to a 2022 UK analysis of 45 studies.^{14, 15}

It turns out smoking during pregnancy was more prevalent in women who carried higher genetic risk for ADHD.⁸ But the researchers note that pregnant women should not smoke because it has other harmful effects on their child's health.

FAQs

Frequently Asked Questions About Hereditary ADHD

Frequently Asked Questions

✓ **Is ADHD inherited from Mom or Dad?**

You can inherit genes that boost risk for ADHD from your mother, from your father or from both parents. In a recent Norwegian study, inherited risk was somewhat higher when a child's mother had ADHD compared to their father, but researchers weren't certain why that would be.

> **What are the main causes of ADHD?**

> **How much of ADHD is genetic?**

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