

NIDCD Fact Sheet | **Voice, Speech, and Language****Stuttering****What is stuttering?**

Stuttering is a speech disorder characterized by repetition of sounds, syllables, or words; prolongation of sounds; and interruptions in speech known as blocks. An individual who stutters exactly knows what he or she would like to say but has trouble producing a normal flow of speech. These speech disruptions may be accompanied by struggle behaviors, such as rapid eye blinks or tremors of the lips. Stuttering can make it difficult to communicate with other people, which often affects a person's quality of life and interpersonal relationships. Stuttering can also negatively influence job performance and opportunities, and treatment can come at a high financial cost.

Symptoms of stuttering can vary significantly throughout a person's day. In general, speaking before a group or talking on the telephone may make a person's stuttering more severe, while singing, reading, or speaking in unison may temporarily reduce stuttering.

Stuttering is sometimes referred to as *stammering* and by a broader term, *disfluent speech*.

Who stutters?

Roughly 3 million Americans stutter. Stuttering affects people of all ages. It occurs most often in children between the ages of 2 and 6 as they are developing their language skills. Approximately 5 to 10 percent of all children will stutter for some period in their life, lasting from a few weeks to several years. Boys are 2 to 3 times as likely to stutter as girls and as they get older

this gender difference increases; the number of boys who continue to stutter is three to four times larger than the number of girls. Most children outgrow stuttering. Approximately 75 percent of children recover from stuttering. For the remaining 25 percent who continue to stutter, stuttering can persist as a lifelong communication disorder.

How is speech normally produced?

We make speech sounds through a series of precisely coordinated muscle movements involving breathing, phonation (voice production), and articulation (movement of the throat, palate, tongue, and lips). Muscle movements are controlled by the brain and monitored through our senses of hearing and touch.

What are the causes and types of stuttering?

The precise mechanisms that cause stuttering are not understood. Stuttering is commonly grouped into two types termed developmental and neurogenic.

▶ Developmental stuttering

Developmental stuttering occurs in young children while they are still learning speech and language skills. It is the most common form of stuttering. Some scientists and clinicians believe that developmental stuttering occurs when children's speech and language abilities are unable to meet the child's verbal demands. Most scientists and clinicians believe that developmental stuttering stems from complex interactions of multiple

factors. Recent brain imaging studies have shown consistent differences in those who stutter compared to nonstuttering peers. Developmental stuttering may also run in families and research has shown that genetic factors contribute to this type of stuttering. Starting in 2010, researchers at the National Institute on Deafness and Other Communication Disorders (NIDCD) have identified four different genes in which mutations are associated with stuttering. More information on the genetics of stuttering can be found in the research section of this fact sheet.

► Neurogenic stuttering

Neurogenic stuttering may occur after a stroke, head trauma, or other type of brain injury. With neurogenic stuttering, the brain has difficulty coordinating the different brain regions involved in speaking, resulting in problems in production of clear, fluent speech.

At one time, all stuttering was believed to be psychogenic, caused by emotional trauma, but today we know that psychogenic stuttering is rare.

How is stuttering diagnosed?

Stuttering is usually diagnosed by a speech-language pathologist, a health professional who is trained to test and treat individuals with voice, speech, and language disorders. The speech-language pathologist will consider a variety of factors, including the child's case history (such as when the stuttering was first noticed and under what circumstances), an analysis of the child's stuttering behaviors, and an evaluation of the child's speech and language abilities and the impact of stuttering on his or her life.

When evaluating a young child for stuttering, a speech-language pathologist will try to determine if the child is likely to continue his or her stuttering behavior or outgrow it. To determine this difference, the speech-language pathologist will consider such factors as the family's history of stuttering, whether the child's stuttering has lasted 6 months or longer, and whether the child exhibits other speech or language problems.

How is stuttering treated?

Although there is currently no cure for stuttering, there are a variety of treatments available. The nature

of the treatment will differ, based upon a person's age, communication goals, and other factors. If you or your child stutters, it is important to work with a speech-language pathologist to determine the best treatment options.

Therapy for children

For very young children, early treatment may prevent developmental stuttering from becoming a lifelong problem. Certain strategies can help children learn to improve their speech fluency while developing positive attitudes toward communication. Health professionals generally recommend that a child be evaluated if he or she has stuttered for 3 to 6 months, exhibits struggle behaviors associated with stuttering, or has a family history of stuttering or related communication disorders. Some researchers recommend that a child be evaluated every 3 months to determine if the stuttering is increasing or decreasing. Treatment often involves teaching parents about ways to support their child's production of fluent speech. Parents may be encouraged to:

- Provide a relaxed home environment that allows many opportunities for the child to speak. This includes setting aside time to talk to one another, especially when the child is excited and has a lot to say.
- Listen attentively when the child speaks and focus on the content of the message, rather than responding to how it is said or interrupting the child.
- Speak in a slightly slowed and relaxed manner. This can help reduce time pressures the child may be experiencing.
- Listen attentively when the child speaks and wait for him or her to say the intended word. Don't try to complete the child's sentences. Also, help the child learn that a person can communicate successfully even when stuttering occurs.
- Talk openly and honestly to the child about stuttering if he or she brings up the subject. Let the child know that it is okay for some disruptions to occur.

Stuttering therapy

Many of the current therapies for teens and adults who stutter focus on helping them learn ways to minimize stuttering when they speak, such as by speaking more slowly, regulating their breathing, or gradually progressing

from single-syllable responses to longer words and more complex sentences. Most of these therapies also help address the anxiety a person who stutters may feel in certain speaking situations.

Drug therapy

The U.S. Food and Drug Administration has not approved any drug for the treatment of stuttering. However, some drugs that are approved to treat other health problems—such as epilepsy, anxiety, or depression—have been used to treat stuttering. These drugs often have side effects that make them difficult to use over a long period of time.

Electronic devices

Some people who stutter use electronic devices to help control fluency. For example, one type of device fits into the ear canal, much like a hearing aid, and digitally replays a slightly altered version of the wearer's voice into the ear so that it sounds as if he or she is speaking in unison with another person. In some people, electronic devices may help improve fluency in a relatively short period of time. Additional research is needed to determine how long such effects may last and whether people are able to easily use and benefit from these devices in real-world situations. For these reasons, researchers are continuing to study the long-term effectiveness of these devices.

Self-help groups

Many people find that they achieve their greatest success through a combination of self-study and therapy. Self-help groups provide a way for people who stutter to find resources and support as they face the challenges of stuttering.

What research is being conducted on stuttering?

Researchers around the world are exploring ways to improve the early identification and treatment of stuttering and to identify its causes. For example, scientists have been working to identify the possible genes responsible for stuttering that tend to run in families. NIDCD scientists have now identified variants in four such genes that account for some cases of stuttering in many populations around the world, including the United States and Europe. All of these genes encode proteins that direct traffic within cells, ensuring that various cell components get to their proper location within the cell. Such deficits in cellular trafficking are a newly recognized cause of many neurological disorders. Researchers are now studying how this defect in cellular trafficking leads to specific deficits in speech fluency.

Researchers are also working to help speech-language pathologists determine which children are most likely to outgrow their stuttering and which children are at risk for continuing to stutter into adulthood. In addition, researchers are examining ways to identify groups of individuals who exhibit similar stuttering patterns and behaviors that may be associated with a common cause.

Scientists are using brain imaging tools such as PET (positron emission tomography) and functional MRI (magnetic resonance imaging) scans to investigate brain activity in people who stutter. NIDCD-funded researchers are also using brain imaging to examine brain structure and functional changes that occur during childhood that differentiate children who continue to stutter from those who recover from stuttering. Brain imaging may be used in the future as a way to help treat people who stutter. Researchers are studying whether volunteer patients who stutter can learn to recognize, with the help of a computer program, specific speech patterns that are linked to stuttering and to avoid using those patterns when speaking.



National Institute on
Deafness and Other
Communication Disorders



Where can I find additional information about stuttering?

The NIDCD maintains a directory of organizations that provide information on the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language. Visit the NIDCD website at <http://www.nidcd.nih.gov> to search the directory.

Use the following keywords to help you find organizations that can answer questions and provide information on stuttering:

- ▶ Stuttering
- ▶ Speech-language pathologists
- ▶ Physician/practitioner referrals

Visit the NIDCD website at <http://www.nidcd.nih.gov> to read, print, or download publications.

For more information, additional addresses and phone numbers, or a printed list of organizations, contact us at:

NIDCD Information Clearinghouse

1 Communication Avenue
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Toll-free TTY: (800) 241-1055
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Email: nidcdinfo@nidcd.nih.gov

<http://www.nidcd.nih.gov>

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The NIDCD supports and conducts research and research training on the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language and provides health information, based upon scientific discovery, to the public.



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