

# Sickle cell disease: transcranial doppler (TCD)

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## What is a transcranial doppler (TCD)?

A transcranial doppler (TCD) is an ultrasound of the brain.

- It measures the blood flow speed in the main blood vessels of the brain.
- It is safe and painless.
- Your child does not have to do anything special to prepare for it.

## Why is a TCD used?

A child with sickle cell disease (SCD) has a much higher chance of having a stroke than a child who does not have sickle cell disease. A TCD helps to find out which child with sickle cell disease has a higher chance of having a stroke.

## What is a stroke?

A stroke happens when 1 or more blood vessels inside the brain are blocked.

- A stroke can happen without warning. It causes damage to the brain and nerves.
- The damage may never go away.
- The less damage there is, the better the chance for a full recovery.
- The TCD test helps your provider learn if your child has a higher chance of having a stroke before the stroke happens.

## Who should have a TCD?

Children with Hb SS and S Beta 0 Thalassemia between the ages of 2 and 16 years should have the TCD test 1 time each year.

- A stroke can happen as early as 2 years of age. This is why your child should start the screening test at the age of 2.
- Your child's sickle cell provider will talk with you about the test.

## How does the TCD work?

The TCD measures the speed of the blood flow through the blood vessels in the brain. It shows areas that have high or low blood flow speed.

- Blood flow speed depends upon the size of the vessels. It is more difficult for blood to travel if the blood vessels are narrow. The body uses more pressure to push the blood through the small space. This makes the speed of the blood flow through that area higher than normal.
- Higher blood flow speed and smaller blood vessels can increase the chance for a stroke at any time.

**In case of an urgent concern or emergency, call 911 or go to the nearest emergency department right away.**

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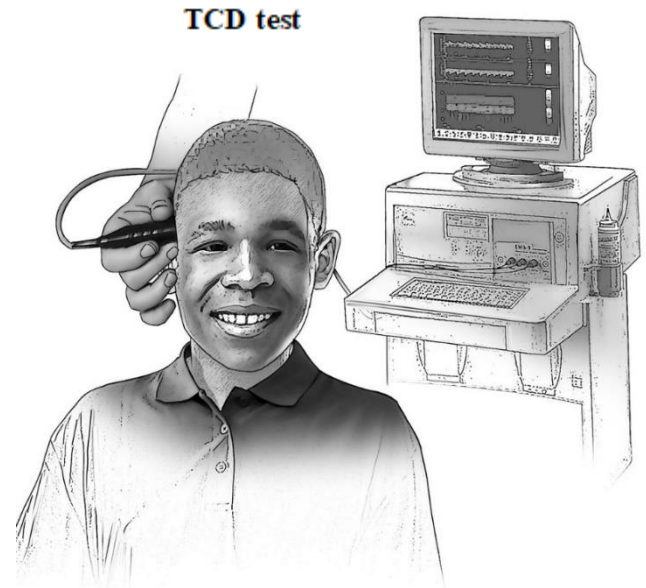
## What should I expect when my child has a TCD?

The TCD is done in the outpatient sickle cell disease clinic when your child is feeling well. Your child may eat, drink and take their medicine as usual. The TCD does not cause pain or discomfort and takes about 30 to 45 minutes.

During the test:

- Your child may wear their own clothes.
- A clear gel is put on their head. A small wand is placed on your child's head to measure the blood flow speed.
- Your child will be awake, but needs to lay still and stay quiet. The test results of the TCD will not be as accurate if your child is moving around or sleeping.

After the test, the area on their head is cleaned, and they can return to their normal activities.



## What do the TCD results mean?

Your child's test may show one of the results below:

- **Normal TCD** means your child has average blood flow speed.
  - Your child needs to have a TCD **1 time each year**.
- **Conditional TCD** means your child's blood flow speed is higher than average.
  - Your child should have a repeat TCD **in 3 to 4 months** to see if their blood flow remains conditional.
- **Abnormal TCD** means your child's blood flow speed is too fast or too slow.
  - This type of blood flow puts your child at risk for having a stroke. They need to have a repeat TCD **within 2 to 4 weeks**.
  - If the TCD is still abnormal, your child will need further treatment to help prevent a stroke.
  - If the TCD is still abnormal, your child's sickle cell provider may also order an MRI (magnetic resonance imaging) of the brain.
- **Inadequate TCD** means your child's test results cannot be read.
  - If this happens, your child will need to repeat the TCD or have a different test.

## When do I get the results?

The pediatric radiologist, a doctor specially trained in children's X-rays, will look at the pictures. They will then send a report to and may talk with your child's sickle cell provider.

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- Your child's sickle cell provider will contact you with the test results.
- Call your child's sickle cell team if you have not received the test results after 5 business days.
- Please make sure we have a **working phone number** for you so we can let you know your child's results.

For more details on sickle cell disease and services, visit the Children's Healthcare of Atlanta website at [choa.org/sicklecell](https://choa.org/sicklecell).

**This teaching sheet contains general information only. Talk with your child's doctor or a member of your child's healthcare team about specific care of your child.**

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