

If one parent has sickle cell trait (AS) and one parent has beta thalassemia trait (Aβ), with each birth there is a 25 percent (1 in 4) chance that the child will inherit a hemoglobin S gene from one parent and a β thalassemia gene from the other parent. If that happens, the child will have sickle cell disease (Sβ disease).



**Sickle Cell Trait (AS)**



**Beta Thalassemia Trait (Aβ)**



**Sickle Cell Disease (Sβ)**



**Beta Thal Trait (Aβ)**



**Sickle Cell Trait (AS)**

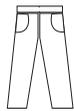


**Normal (AA)**

### What will my children inherit?

- Are you at risk of having a child with sickle cell disease? Circle Yes or No

If yes, what is the chance if your partner has sickle cell trait? \_\_\_\_\_ percent



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



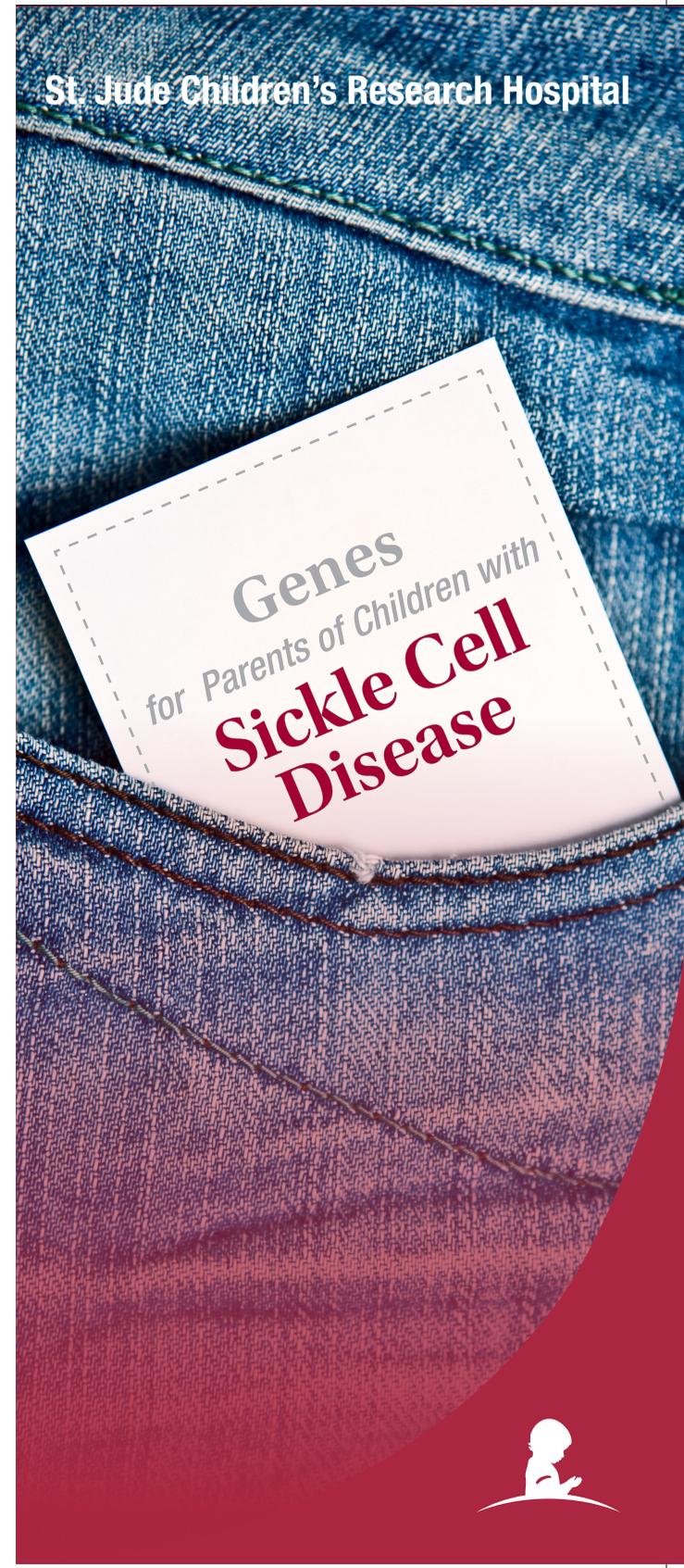
This document is not intended to replace counseling by a trained health care professional or genetic counselor. Our aim is to promote active participation in your care and treatment by providing information and education. Questions about individual health concerns or specific treatment options should be discussed with your doctor. For general information on sickle cell disease and other blood disorders, please visit our website at [www.stjude.org/sicklecell](http://www.stjude.org/sicklecell).

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Knowing your risk **before** you have a child will help you make wise decisions about family planning.



## What are genes?

- Genes determine specific traits that are passed down to you, or inherited, from your parents. These traits are things like eye color, hair color, skin tone, physical features, and the type of hemoglobin in your blood.
- Genes are pieces of DNA that help make you who you are.
- You inherit one set of genes from your mother and one set of genes from your father.

## What is sickle cell disease?

- Sickle cell disease affects part of the red blood cells, called hemoglobin.
- Hemoglobin helps carry oxygen from the lungs to the rest of the body.

## How are genes related to sickle cell disease?

- Everyone has 2 hemoglobin genes. One gene is passed down from the mother and one is from the father.
- People with sickle cell disease inherit a hemoglobin S gene from one parent and another abnormal hemoglobin gene from the other parent.

## What is sickle cell trait, and how is it different from the disease?

- People with sickle cell trait, called AS, inherit the normal hemoglobin A gene from one parent and an abnormal hemoglobin S gene from the other parent.
- Having the sickle cell trait does not mean you have sickle cell disease.
- If you have the trait, you can pass it to your child.
- If you and your partner both have the trait, you might have a child with the sickle cell disease.

## Are there different types of sickle cell disease?

Yes, sickle cell disease is a name for a group of disorders that have sickle hemoglobin. These are the most common types of sickle cell disease in the United States:

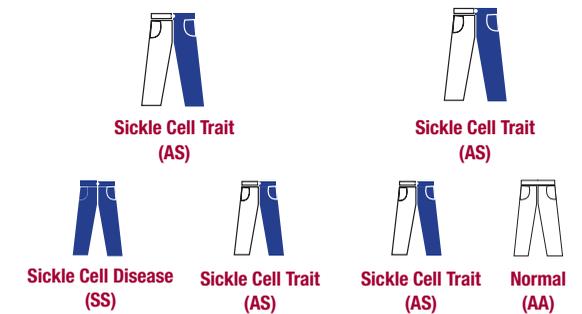
- ◀ Homozygous sickle cell disease (hemoglobin SS disease)
- ◀ Sickle hemoglobin C disease (hemoglobin SC disease)
- ◀ Two types of sickle beta thalassemia disease:
  - Sickle beta plus thalassemia disease (hemoglobin S $\beta$ <sup>+</sup> disease)
  - Sickle beta zero thalassemia disease (hemoglobin S $\beta$ <sup>0</sup> disease)

## How is sickle cell disease inherited?

- People can inherit sickle cell disease in 3 different ways:
  - If both parents have sickle cell trait (AS)
  - If one parent has sickle cell trait (AS) and the other parent has another abnormal hemoglobin trait, such as AC, A $\beta$
  - If both parents have sickle cell disease.
- Someone with hemoglobin SS disease inherited 2 hemoglobin S genes, receiving one from each parent.
- Someone with hemoglobin SC disease inherited a hemoglobin S gene from one parent and a hemoglobin C gene from the other parent.
- Someone with hemoglobin S $\beta$  disease inherited a hemoglobin S gene from one parent and a hemoglobin  $\beta$  gene from the other parent.

## What are the chances of passing down sickle cell disease to my children?

If both parents have sickle cell trait (AS), with each birth there is a 25 percent (1 in 4) chance that the child will inherit hemoglobin S genes from both parents and have sickle cell disease (SS disease).



If one parent has sickle cell trait (AS) and the other parent has hemoglobin C trait (AC), with each birth there is a 25 percent (1 in 4) chance that the child will inherit a hemoglobin S gene from one parent and a hemoglobin C gene from the other parent. If that happens, the child will have sickle cell disease (SC disease).

