

Sickle Cell Disease

In the United States, sickle cell disease occurs in approximately 1 in 2,500 newborns. It is more prevalent than any other condition identified by newborn blood screening.

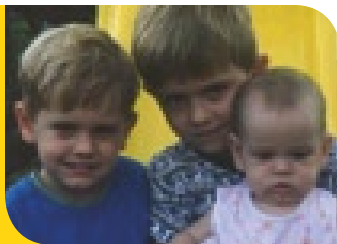
I. What is Sickle Cell Disease?

Sickle cell disease (SCD) is the term used to refer to a group of complex genetic disorders variably characterized by anemia; severe pain; potentially life-threatening complications such as bacterial septicemia, splenic sequestration, acute chest syndrome, stroke, and chronic organ damage. These and other clinical manifestations result from chronic hemolysis and intermittent episodes of vascular occlusion that cause tissue injury and organ dysfunction. SCD is inherited in an autosomal recessive manner. Heterozygous individuals (carriers) have sickle cell trait, a generally benign, asymptomatic genetic carrier state. Homozygous and compound heterozygous individuals have symptomatic disease. Four genotypes – sickle cell anemia (HbSS), sickle-hemoglobin C disease (HbSC), and two types of sickle β -thalassemia (sickle β^+ -thalassemia and β^0 -thalassemia) – account for most SCD in the United States.

II. What is the Incidence of Sickle Cell Disease?

It is estimated that over 2 million Americans are genetic carriers of SCD and that 70-80,000 Americans have sickle cell disease.^{1,2} A common misperception is that SCD affects only people of African ancestry, however, SCD can affect persons of any race or ethnicity. Genes for SCD are common in persons of African, Mediterranean, Middle Eastern, and Indian ancestry and persons from the Caribbean and parts of Central and South America. SCD occurs in approximately 1 in 350 African-Americans. Overall, the prevalence of SCD in US newborns is 1 in 2,000-2,500, greater than that of any other condition detected by newborn blood screening.

"Sickle Cell Disease can affect ANY race! My husband and I are a Caucasian couple with 3 beautiful children that have sickle beta plus thalassemia. I am of Italian decent and have thalassemia trait. When I was pregnant I was tested and my doctor wanted to test my husband for it as well. I received a call several days later that he had sickle trait. I said, 'No way! My husband has blonde hair and blue eyes.' We thought at the time that this disease was **only** a black disease. We now have 2 sons and 1 daughter that have sickle beta plus thalassemia, one with blonde hair and blue eyes."



III. Sickle Cell Disease in Children: The Importance of Early Diagnosis and Treatment

A demonstration in 1986 that prophylactic penicillin markedly reduces the incidence of pneumococcal sepsis provided a strong rationale for the widespread implementation of newborn screening for SCD. Newborn screening, when linked to timely diagnostic testing, parental education, and comprehensive care, markedly reduces morbidity and mortality from SCD in infancy and early childhood. In 1987, a consensus panel recommended "universal screening of all newborns for hemoglobinopathies."³

Currently, 47 states, the District of Columbia, Puerto Rico, and the Virgin Islands provide universal newborn screening for SCD. Screening is available only by request in the other three states, although universal screening is provided for disorders (e.g. classical galactosemia) estimated to be less common in those states than SCD. Screening by request is problematic because infants with SCD often escape testing.

IV. Sickle Cell Disease Fever Alert

Because children with SCD develop functional asplenia as early as 3 months of age, fulminant infection with *S pneumoniae* and other encapsulated bacteria is the most common cause of death in infancy and childhood. Thus, immunization with pneumococcal conjugate and polysaccharide vaccines, penicillin prophylaxis, and education about the importance of urgent evaluation of all illness with temperature greater than 38.5°C are critical. Evaluation and treatment of fever includes rapid triage and physical assessment, urgent CBC and reticulocyte counts, blood culture (plus cerebrospinal fluid analysis and other cultures as indicated), and prompt administration of a broad-spectrum parenteral antibiotic, such as ceftriaxone. The presence of a focus of infection (e.g., viral upper respiratory illness, otitis media) does not alter the urgency of administering parenteral antibiotics. Because of the prevalence of resistant pneumococci, vancomycin should be added for proven or suspected meningitis and other severe illness. Other potentially life-threatening complications, such as splenic sequestration and acute chest syndrome, often occur with fever.

