



Quick Facts

- ▶ SMA is the most common inherited cause of early childhood death.
- ▶ The disease is characterized by progressive muscle weakness and eventual paralysis.
- ▶ SMA is found in all populations regardless of race.
- ▶ Carrier frequency is between 1/40 and 1/60.
- ▶ The SMA carrier screen identifies ~90% of carriers. The order code is SMACS.

*For more information,
please contact your
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Spinal Muscular Atrophy Carrier Screen

SMN1 Copy Number Analysis

CLINICAL APPLICATION

- Spinal muscular atrophy (SMA) is the most common inherited cause of early childhood death and the second most common autosomal recessive disorder after cystic fibrosis.
- The estimated disease prevalence is about 1 in 6,000 to 1 in 10,000 live births, with a carrier frequency between 1/40 and 1/60.
- SMA carrier testing by *SMN1* copy number analysis identifies 90% of SMA carriers.
- SMA is found in all populations, regardless of ethnic background. Therefore, the American College of Medical Genetics recommends that SMA carrier screening be offered to all couples prior to conception or early in the pregnancy to allow the couples to make informed reproductive decisions.
- SMA carrier testing is not indicated for use as a diagnostic test. For disease diagnosis, order the test named Spinal Muscular Atrophy, Diagnostic Study.

CLINICAL BACKGROUND

- SMA is a severe neuromuscular disease characterized by the degeneration of motor neurons in the spinal cord.
- The disease is characterized by hypotonia, progressive muscle weakness, paralysis and respiratory stress.
- SMA is caused by mutations in the Survival Motor Neuron (*SMN1*) gene and in 95% of SMA patients, both copies of *SMN1* exon 7 is deleted. Five percent of affected individuals are heterozygous for a *SMN1* deletion in one of two alleles and a *SMN1* point mutation in the second allele.
- *De novo* mutation of one allele occurs in approximately 2% of individuals affected with SMA. In these cases, only one parent will carry a *SMN1* mutation.

TECHNICAL INFORMATION

- The SMA carrier screen employs real-time PCR to assess *SMN1* copy number to define carrier status for an individual.
- Approximately 4% of the general population have two copies of *SMN1* on one chromosome and zero copies of *SMN1* on the other chromosome. Other carriers may have a point mutation in one of two *SMN1* copies. Neither carrier type can be detected by *SMN1* copy number analysis.
- Conventional SMA diagnostic assays cannot identify heterozygous carriers of *SMN1* exon 7 deletions; instead *SMN1* copy number assays must be utilized.

TEST INFORMATION

SPINAL MUSCULAR ATROPHY CARRIER SCREEN - SMN1 COPY NUMBER ANALYSIS	
DESCRIPTION	SPINAL MUSCULAR ATROPHY CARRIER SCREEN
METHOD	REAL-TIME PCR
ORDER CODE	SMACS
CPT CODE	83891(1), 83900(1), 83896(2), 83912(1)
SPECIMEN REQUIREMENTS	WHOLE BLOOD (1ML MINIMUM, 5ML PREFERRED) IN EDTA, SODIUM CITRATE OR ACD TUBE.
RANGES	SMN1 EXON 7 DELETION NOT DETECTED

Selected References

1. Prior T. Carrier screening for spinal muscular atrophy. Genet Med. 2008;10(11):840-842.
2. Prior T, Snyder P, Rink B, Pearl D, Pyatt R, Mihal D, Conlon T, Schmalz D, Montgomery L, Ziegler K, Noonan C, Hashimoto S, Garner S. Newborn and carrier screening for spinal muscular atrophy. Am J Med Genet A. 2010; 152A(7):1608-1616.

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